BRITISH MEDICAL JOURNAL

LONDON SATURDAY JANUARY 15 1949

PULHEEMS

A NEW SYSTEM OF MEDICAL CLASSIFICATION

BY

ROY T. FLETCHER, M.B.E., M.D.

Major, R.A.M.C.

(From the Hygiene Directorate, War Office)

The Pulheems system of medical classification was officially adopted by the Army on April 1, 1948. It has also been accepted by the Royal Navy, the Royal Air Force, and the Ministry of Labour and National Service, whose Medical Boards took it into use on June 1, 1948.

The object of this paper is to introduce Pulheems to the profession and to stimulate interest in this new system of classification so that doctors called upon to examine recruits or to act as medical officers will be familiar with the principles involved. The Pulheems system commands attention because it provides us for the first time with a method of expressing on paper in a concise and easily recognizable form the physical and mental capacities of an individual. I consider that when it becomes generally known it will be accepted by the profession and applied on a wide basis. Certainly it goes a long way towards unifying and rationalizing our standards and towards improving our "clinical" appreciation of physical and mental fitness. While we are still unable to measure physical and mental capacity by purely clinical means, Pulheems is undoubtedly a great advance on methods hitherto employed.

It is hardly surprising that the Forces Medical Services should be responsible for developing a comprehensive system of medical classification, since in the Services organized medicine has been developed to a high level and Service requirements clearly call for some means of assessing accurately the fighting-man's physical and mental capacity. It seems probable that with a National Health Service, and in view of the necessity for the economic employment of our man-power in industry and elsewhere, the Pulheems system of medical classification will meet an essential need. Further, if the physical fitness of our people is to be safeguarded comprehensive health surveys of the population will have to be undertaken, and in order to derive full benefit from such surveys we must pay due attention not only to clinical states but also to "health" or physical and mental capacity.

Medical Classification in the Past

The need for a system of medical classification in the Army became apparent during the South African War (1899–1902), when for the first time officers and men were examined with respect to their physical fitness for service at home or abroad. It was not until the war of 1914–18 that any further breakdown of these two broad classes was attempted; and following the introduction of the Military Services Act in January, 1916, the scope of medical classification was extended to include all serving officers and men at home and abroad. The system of lettered categories, which later became so familiar, was introduced at that time, and it was with this system of classification in vogue that we were called upon in 1939 to face the war. During the ensuing years the increasing demands on man-power necessitated successive extension of the medical categories used, and as a result the category system became more and more complicated, while at the same time it failed to meet the new demands placed upon it.

Briefly, the reasons for the failure of the former system of medical categorization are as follows:

The medical categories used (*a*) did not adequately define a man's physical or mental limitations, and it was therefore not possible to allocate the man to employment in which full use could be made of those capacities which were not in any way impaired; (*b*) gave no indication of the mental and emotional make-up of the individual, factors which in total warfare are no less important than the physical attributes; and (*c*) merely indicated restrictions on employability of a very generalized nature, giving no information about the particular disability involved. They therefore provided no guidance on the most suitable type of work for any given soldier with due regard to the nature of his disability. In short, the medical category system was designed to meet the requirements of our traditional Army (and particularly the infantry soldier), which marched on its feet and fought with a rifle. It was not a system designed to cater for the modern mechanized Army engaged in technological conflict.

With the introduction of personnel selection procedure into the Army in 1942, the deficiencies and shortcomings of the medical category system were further revealed and emphasized. The range of employments available in a modern army is extremely wide and varied, and each individual job brings into use different mental and physical functions, which in turn may have to be qualified according to the conditions and environment in which the work has to be performed—e.g., tropical, arctic, front-line action, etc. It will be agreed that to ply a trade under direct shell-fire is totally different from practising the same trade in the safety of a base workshop, and that a man with chronic ear disease who may be perfectly fit to serve in a temperate climate is likely to break down when serving in the Tropics or subtropics. Clearly, minor disabilities which are of little significance to a member of the training staff of a static base installation can represent a serious liability in an active combatant unit.

From the foregoing it is apparent that the lettered system of medical categorization proved very wasteful from the point of view of man-power economy. In order to employ men satisfactorily in the Army the medical authorities must provide a clear-cut specification of the individual's

functional capacities. Only in this way can men be employed to the best advantage, man-power economy be effected, and the individual himself be satisfied.

Progress towards a New System

Had it not been for the crisis of 1939 it is likely that steps would have been taken to improve our system of medical classification to meet the demands of mechanization and the numerous new employments created; but the British Army authorities considered it both undesirable and totally impracticable to introduce a new system once war had started. However, in 1943 the Canadian Army authorities introduced a new system of medical classification which they called "Pulhems," chief credit for which goes to Major-General Brock-Chisholm, then Director-General of the Canadian Army Medical Services. It was he who first suggested that men should be examined in respect of seven subdivisions of bodily and mental function, and as a result a committee was appointed to investigate the possibilities of such a scheme. This committee designed the Pulhems system of medical classification now used by the Canadian Army.

Subsequently the attention of the British Army authorities was drawn to this system and selected groups of Army intakes were examined by that method. The trial, though limited, proved that it was possible to assess the *functional* capacity of the individual and record the findings in terms which would be easily understood by his employers (and selection officers); but, as already indicated, it was not possible to introduce the system generally at that time. In 1946 an Inter-Services Committee was formed "to devise a system of medical classification which would be suitable for use by the Royal Navy, the Army, and the Royal Air Force." It was agreed that "Pulhems" should form the basis of discussion, and eventually this committee devised the system known as "Pulheems—a system of medical classification for the Fighting Services." It is this system which has been adopted and which I will now proceed to describe.

The Pulheems System of Medical Classification

The Qualities.—Under the Pulheems system of medical classification examination of the individual is carried out objectively, with particular reference to *seven* subdivisions of bodily and mental function, the code letters of which go to make up the word "Pulheems" as follows:

P—Physical capacity
U—Upper limbs
L—Locomotion
H—Hearing (acuity)
EE—Eyesight (visual acuity)
M—Mental capacity
S—Stability (emotional).

These subdivisions are known as *qualities.*

Visual Acuity (EE).—Under the former systems of medical categorization specified visual standards were laid down and each category was permitted certain of these standards—e.g., A1—V.S.1, 2, or 3; A3—V.S.4; A4—V.S.5 or 6, etc. Such visual standards are still being used by the Canadian Army, hence their use of the single "E." The Royal Navy and the Royal Air Force found that the wide range of vision permissible in some of the categories previously used made accurate employment of men in various technical trades extremely difficult. In the discussions which took place on the subject these two Services insisted that, to meet the requirements of their tradesmen, the new system must specify the precise degree of visual acuity in each eye separately, both without and with the aid of glasses. This requirement was met by introducing a separate "E" for each eye, subdividing the medical box under each of the "E's" so that the unaided vision could be shown in the upper half of the box and the aided vision in the lower half. The method of recording visual acuity is based on the following standards:

6/6 = 1	6/24 = 5
6/9 = 2	6/36 = 6
6/12 = 3	6/60 = 7
6/18 = 4	Less than 6/60 = 8

Thus, for example, EE is recorded as follows for a man whose uncorrected vision is R=6/12, L=6/18 and whose corrected vision is R=6/6, L=6/9:

E	E
3	4
1	2

the first "E" indicating the visual acuity in the *right* eye and the second "E" that in the left eye.

Degrees of Each Quality.—There are eight degrees under each quality, but for reasons which will emerge later not all of these are used in the case of U, L, H, M, and S, as the following table shows:

P	U	L	H	E	E	M	S
1	1	1	1	1	1	—*	—*
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	—	—	—	4	4	—	—
5	—	—	—	5	5	—	—
6	—	—	—	6	6	—	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8

Functional Interpretation of the Degrees of Each Quality

The degrees of each quality, excepting H and EE, refer to functional ability. The degrees of H and EE are related to definite standards of hearing and eyesight, degree 8 under H signifying the man is unfit for any form of military service. Table I shows in detail the functional requirements of the degrees used under each of the qualities other than EE. Under this quality the minimum visual requirement for certain essential duties—e.g., shooting, driving, etc.—is detailed.

Climatic Restriction.—During the 1939–45 war major causes of invaliding to the United Kingdom from overseas theatres were skin, ear, eye diseases, and psychiatric disorders. After treatment in the United Kingdom many of these men recovered sufficiently to become fit even for full combatant duties provided they were retained in a temperate climate. In order to avoid sending such men to climates where they would break down because of disabilities which remain quiescent only in a temperate climate it is essential to indicate the necessity for climatic limitation. Under the Pulheems system degrees 4, 5, 6, and 7 are used for this purpose. In the assessment of the qualities U and L, any pathological condition of the limbs, such as osteomyelitis, will have a general constitutional effect. This also applies to diseases of the ears and eyes—as opposed to hearing (H) and eyesight (EE). It is therefore convenient to confine the specification of climatic restriction so far as the qualities P, U, L, H, and EE are concerned to the assessment of the P quality only, and for this reason degrees 4, 5, and 6 are not used under U, L, and H. With regard to M and S, experience in the last war indicates that men of low intelligence adapt themselves poorly to strange and unfamiliar surroundings. Intelligence once assessed remains a constant factor and is not directly related to the question; for Army purposes,

*With regard to "M" and "S," degree 1 implies functional efficiency "above average," which it was considered extremely difficult to assess; thus degree 2 under these qualities indicates normal or better.

TABLE I.—*Guide to Pulheems: Functional Interpretation of Degrees of Each Quality*

TABLE I.—*Guide to Pulheems: Functional Interpretation of Degrees of Each Quality*

MEN

Degree	P	U	L	H	EE	M	S
1	Fit, after training, for full strain and fatigue on combatant duty. Fit to withstand exposure to all kinds of weather. A front-line fighter in any part of the world	Muscle power above average. Must be able to handle a rifle and do heavy manual work, including digging, pushing, dragging, heaving, lifting, and climbing. All tasks carried out with rapidity and efficiency	Capable of very severe locomotor strain for 5 or 6 days. Can undertake forced marches and fight at the end of such marches. Can run, climb, jump, crawl, dig, and perform all kinds of labour quickly	Very good hearing. Ability to hear sufficiently well to perform any duty	Unaided vision E E E E 3 3 or 1 6 – – – – Able to see to shoot and drive		
2	Fit for normal work or strain but unable to endure "extreme" degrees for long periods. A front-line fighter in any part of the world	Muscle power average. Able to do all a U1 man can do but at a slower pace	Same as L1, but pace may be slower	Good hearing. Able to hear sufficiently well to perform any duty	Aided vision E E E E 8 8 8 8 – – or – – 3 3 1 6 Able to see to shoot and drive	Ability under Army conditions to learn to perform successfully full combatant duties. Includes those who can be trained as tradesmen and specialists	Emotionally fit to perform Army duties adequately under full combatant conditions in any part of the world
3	Fit for ordinary work. Has not the stamina, even after training, to endure the strain and fatigue of full combatant duty. Fit for restricted service in any part of the world	Must be able to use a weapon for defensive purposes and be capable of less severe forms of manual work than U2	Capable of marching 5 miles or further in an emergency. Able to stand for periods of at least 2 hours. Fit for guard duties	Able to hear sufficiently well to perform any duty where moderate impairment of hearing does not disqualify	Aided vision E E E E 8 8 8 8 – – or – – 3 6 6 3 Able to see to drive but not to shoot	Ability under Army conditions to learn to perform simple labouring duties, including fitness to bear arms in self-defence	Whilst having a history of emotional instability is at present well adjusted and fit to serve in any part of the world in a role which is not primarily a fighting one
4	Fit, after training, for full strain and fatigue of full combatant duty provided he serves in temperate climates only				Aided vision E E 8 8 – – 5 5 Able to see for ordinary purposes (not shooting or driving—binocular)		
5	Fit for normal work or strain but unable to endure "extreme" degrees for long periods. Fit for service in temperate climates only				Aided vision E E E E 8 8 8 8 – – or – – 3 7 7 3 Able to see for ordinary purposes (not shooting or driving—monocular)		
6	Fit for ordinary work. Has not the stamina, even after training, to endure the strain and fatigue of full combatant duties. Fit for restricted service in temperate climates						Whilst having a history of emotional instability is sufficiently well adjusted to serve in temperate climates in a role which is not primarily a fighting one
7	Capable of performing useful Army duties within limits of his disabilities. Not likely to break down if suitably employed, which includes time for regular meals and rest. Service in U.K. only	Capable of sedentary and routine work of a lighter type. Includes personnel unable to bear arms on account of physical disability (ankylosis of elbow, etc.). Service in the U.K., but may serve overseas in the base area	Able to walk 2 miles per day at own pace. Can stand for moderate but not prolonged periods. Service in the U.K., but may serve overseas in the base area	Able to hear sufficiently well to perform any duty where marked impairment of hearing does not disqualify. Service in the U.K., but may serve overseas in the base area	The E E boxes bear no relation to the degrees of the other qualities—i.e., P, U, L, H, M, and S—being a simple record of vision unaided and aided	Because of low mental capacity is unfit to bear arms, but is capable of simple labouring duties under supervision, including a minimum of responsibilities. Service in U.K. only	Emotionally fit to perform Army duties adequately under living conditions favourable to the individual in the U.K.
8	UNFIT FOR ANY FORM OF MILITARY SERVICE						
Factors to be considered	Age, build, strength, and stamina-guts	Strength, range of movement, and general efficiency of upper arm, shoulder, girdle, and back	Strength, range of movement, and efficiency of feet, legs, pelvic girdle, and lower back	Auditory acuity	Visual acuity	Mental capacity	Emotional stability

however, men whose mental capacity is incompatible with employment in any part of the world can be employed only at home (i.e., degree 7), hence degrees 4, 5, and 6 are not used under M. The S quality has a material bearing on climatic restriction, but it is considered that a man who requires restriction to service in a temperate climate because of emotional instability is unlikely to be employable in a combatant role; therefore under S degrees 6 and 7 only are used. Men with psychosomatic disorders—e.g., effort syndrome, functional dyspepsia, etc.—may require a lower assessment under P as well as S. Finally, if an individual has a low assessment under one of the qualities other than P, it does *not* follow that the same assessment must be made under P—e.g., a man who is assessed L7 but is physically fit to be assessed P3 should be classified P3 and not P7. Lowering of the P assessment to 7 in such a case would impose unnecessary restriction on employment. Any individual, however, assessed degree 7 under P, M, or S can serve only in the United Kingdom.

From the foregoing it will be seen that climatic restriction is decided by the assessment of the individual under the qualities P and S, and to a lesser extent under the quality M. Employment within the various areas in the theatre—i.e., forward, lines of communication, or base—is dependent thereafter on the complete assessment.

Temporary Assessment.—(*a*) *"R" Assessments*:—Where an individual is suffering from a condition which is remediable by surgical operation or other means (e.g., hernia, poor physique) he is classified according to his present capacities (but not lower than 7) and the letter R is inserted immediately after the degree of P, U, L, or S affected, the period of temporary restriction from full duty of the assessment being stated—e.g., P3R for three months. Such an individual remains on duty, and at the conclusion of medical treatment is reassessed.

(*b*) *"O" Assessments*:—When an individual is off duty and under medical care he is temporarily unfit for military service. This is shown as degree "O" under P, U, L, or S as appropriate and the period of temporary incapacity is stated—e.g., P—"O" for six months.

Method of Assessment.—The medical assessment of any man under this system is based on *functional efficiency at the conclusion of training*. For this reason the *pre-Service* assessment allotted by the civilian medical board is verified by the military medical authorities when the man joins for duty and an *initial* assessment is allotted. At the conclusion of basic training a full medical examination is carried out and a Service assessment is made, which remains effective until alteration is considered necessary by a military medical board. To record the findings, in addition to the assessment under each of the seven qualities, age (represented by the last two figures of the year of birth), height, weight, and colour perception standard are recorded in a medical box, in which there is space to enter the reason for an assessment below 2 under P, U, L, or S. The medical box takes the following form:

Y. O. B.	P	U	L	H	E	E	M	S
20	2	2	3	1	1	1	2	2
Ht. 68 ..	P							
C.P. 2 ..	U							
Wt. 138 ..	L	Pes planus—moderate. Medical board: 3/7/46						
	S							

Such an assessment indicates a man who is fit in every way except for a moderate degree of flat-foot, and at a glance it is easy to see that he is suitable for full employment in any part of the world with mechanized troops but not with infantry (because of L3).

With the introduction of the Pulheems system into the three Services it has been necessary to review medical documentation in general, and a much improved system is being devised for use by all three Services which it is hoped will be introduced in the near future.

Administrative Application of the System

From Table I it will be seen that the degrees of P, U, L, H, M, and S are interpreted and signify suitability for various ranges of employment as follows:

TABLE II

Degree	Functional Capacity	Combatant Capacity	Climatic Restriction
1	Above average	Full	Nil
4	Above average	Full	Temperate
2	Average	Full	Nil
5	Average	Full	Temperate
3	Moderate defect	Restricted	Nil
6	Moderate defect	Restricted	Temperate
7	Marked defect	Restricted	Service in U.K. only
8	UNFIT FOR ANY FORM OF MILITARY SERVICE		

The term "restricted" implies service in a role which is not primarily a fighting one.

It is evident, therefore, that the Pulheems code number (i.e., the recorded assessment) provides in effect a complete indication of the fitness, physical and mental, of the individual for employment under varying conditions. It is possible to reduce this code number to a simple two-letter code for use as an employment standard, and so simplify the administrative application of the system.

This has been done within the Army and the Royal Air Force, and the employment standards used by the Army are as follows:

FE—Employable on full combatant duties in any area in any part of the world (FE—forward everywhere).

FT—Employable on full combatant duties in any area in temperate climates (FT—forward temperate).

LE—Normally employable in the lines of communication or base area in any part of the world, but may be employed in the forward area in any role which is not primarily a fighting one (LE—L. of C. everywhere).

LT—Normally employable in the lines of communication or base areas in temperate climates only, but may be employed in the forward area in any role which is not primarily a fighting one (LT—L. of C. temperate).

BE—Employable only in the base area in any part of the world (BE—base everywhere).

BT—Employable only in the base area in temperate climates (BT—base temperate).

HO—Employable in the protected area in the United Kingdom only (HO—home only).

It has been said that the two essentials required in any system of medical classification are (*a*) a detailed qualitative estimation of the individual, and (*b*) a qualitative analysis of the available employments expressed in the same terms.

Under the Pulheems system these two requirements are met. For the Army's purposes employment standards have been worked out in relation to each arm of the Service. For employment forward of the base the standard has been set according to the general functions of the arm, while in base areas it has been determined in relation to the actual employment itself. This difference is necessary to meet the requirements of reinforcement demands.

Minimum Standards: The Infantry Soldier

To conclude my description of the Pulheems system of medical classification and to provide an illustration of the working of the system it is convenient to start with the specifications of the infantry soldier, since it is such men whom every army particularly needs and who must possess the highest standards of physical competence. To be efficient an infantry soldier must have the following functional attributes:

P for Physical Capacity.—"Must be able to endure severe strain, do heavy physical work, and engage in hand-to-hand combat."

These are general capacities derived from a man's whole physical development: his height and weight, his ability to acquire physical stamina with the proper training, his capacity for work, and his general good health.

U for Upper Part of the Body, or Upper Limbs.—"Must be able to lift and carry heavy loads. Be able to dig and throw hand grenades and use weapons."

To do these things a man must have strong arms, shoulders, and back, and must be able to use his hands with normal dexterity.

L for Lower Part of the Body, or Locomotion.—"Must be able to stand at his post for long hours and march more than 20 miles a day without difficulty."

H for Hearing.—"Hearing must be good so that he can understand commands made under difficult conditions and hear suspicious sounds when on night watches."

EE for Eyesight.—"Must be able to see the enemy at considerable distance and use his rifle sights with either eye."

M for Mental Capacity.—"Must be intelligent in order to learn the use of his specialized weapons and field craft."

S for Stability (Emotional).—"Must also be a man of stable temperament with self-confidence and determination."

Expressed in terms of Pulheems, the minimum standard permissible for the infantry soldier therefore is:

P	U	L	H	E	E	M	S—Employment Standard
				8	8		
2	2	2	2	–	–	2	2—F.E.
				3	3		

Discussion

Under Pulheems the emphasis is placed on the functional capacity of the individual to work rather than on any existing abnormality, whether anatomical or otherwise. It is generally agreed by all concerned that, given a reasonably correct functional assessment of a man's ability to work, a more accurate allocation to suitable employment becomes possible. It is hoped that in the future there will be few, if any, "square pegs in round holes" in the Services.

One of the factors on which there is some diversity of view among medical men is the effect of the age of the individual on assessment, particularly under the P quality. It must be admitted that as one advances in years moderate constitutional defects begin to appear which can easily be recognized on examination, such as increase in weight, rise in blood pressure, cardiac irregularity, and so on; and over the age of 40 years the likelihood of a man or woman being assessed P1 or P2 becomes less and less as age advances. In the absence of such constitutional defects, however, in a man of good physique and with a good previous history there is no reason why an assessment of P2 should not be given to the really fit individual. In an organization such as the Army, the medical officer is inclined to think in terms of "fighting" fitness, and therefore he tends to assess the 40-year-olds and over as P3 rather than P2. It should always be remembered that the employment of an individual must be governed by both his medical fitness *and* his age, and the latter alone is sufficient to contraindicate posting in a fighting role.

The Pulheems system of medical classification was subjected to some criticism because for the first time in the history of medical categories in the Services it specifically took into consideration the two qualities mental capacity (M) and emotional stability (S) and introduced their routine assessment for each individual. It has even been stated in this connexion that the Pulheems system was little more than a "psychiatric racket" which, it was implied, might be detrimental to and prejudice the chances of men entering the Forces. There can surely be few to-day who would deny that psychiatric disorders are as important as physical diseases, and in the light of increasing knowledge the dichotomy between mind and body appears more and more arbitrary and indistinct. Medical fitness is a *total* problem, and we cannot separate the mind from the body. It is hoped that the introduction of Pulheems by the Services will help to underline in the mind of the public as well as in that of the medical profession the importance of regarding the individual as a complete unit, in whom the mental and physical functions must be considered and assessed simultaneously. Service medical officers are trained to use their clinical judgment in assessing an individual as normal or better—i.e., M2 and S2; it is only when there is doubt or any definite indication that the individual is abnormal that psychiatric advice should be obtained.

Within the Services, therefore, it has been possible to introduce a new system of medical classification which, while giving a much more detailed picture of the man's capacity to work, is also very simple in its application and use by non-medical personnel. In the Army, standards have been worked out for all the trades and employment available; and it is hoped to take steps to prove our norms and in the end to obtain some definite information on what is compatible with normal and what is definitely abnormal.

The tendency in the past in the medical world has been to teach the medical student the care of the sick and disabled, little attention being paid to his education in what is considered normal. There are many ways of being "well," but the whole question of just how well a man must be in order to carry out satisfactorily any particular one of the hundreds of jobs that are available in a modern army has never been satisfactorily determined. The present drive towards positive health will, it is hoped, be very materially assisted by the use of Pulheems, since it is evident that an accurate method of assessing the fitness of an individual is a prerequisite of the determination of positive health. It is for these reasons that I suggest that such a system need not be confined to the Services alone and could well be used by industry generally, police forces, and other similar bodies.

It would appear from Service experience regarding medical classification generally that comparatively little attention has been paid to it in the past, and that the systems of classification formerly used have not been understood properly either by medical men or by laymen. Where the employment of men has been considered, a great deal of stress has been placed on welfare, environment, working conditions, and so on, but practically no attention has been given to the question of their fitness for their particular type of employment. It is hoped that academic bodies in the future will consider teaching *methods* of medical classification to medical students and also to postgraduates. It is contended that the concentration on disease in hospital teaching and elsewhere is unwise, and that the time has come when more consideration must be given to health

and fitness and the application of clinical knowledge to its assessment. Almost all medical men are called upon at one time or another to examine men for the Services, and the despairing efforts of the newly qualified medical officer when faced with a group of recruits whose fitness he is expected to assess is well known. The fault lies essentially with the teaching rather than with the new doctor.

One of the difficulties in using any system of medical classification is the wide divergence of opinion among medical men regarding assessment generally and more particularly the influence of various diseases and other morbid conditions on assessment. In the literature which has been produced by the Services on the Pulheems system an attempt has been made to issue some guidance in this matter. It is hoped that with increasing experience this aspect of the subject will be reviewed from time to time and greater precision will be achieved. It remains for civilian bodies to carry the project one stage further. If it is possible to achieve the necessary liaison between civil and military medical authorities there seems to be no reason why in the end all medical men should not be able to allot to each individual the same medical assessment, a development which would be more than welcome to the Services.

Conclusion

The Pulheems system of medical classification has been introduced in the Services to remedy the shortcomings of previous systems used and to facilitate the optimum employment of man-power. Our objectives briefly are: to set up a common system for use by all three Services; to provide a functional assessment of the individual's capacity for work; to assist in expressing the physical and mental attributes appropriate to individual trades and employments within each Service; to allocate men to the employment for which they are most suited in view of their physical, intellectual, and emotional make-up; and to provide a system which is administratively simple to apply in both peace and war.

I consider that the introduction of Pulheems by the fighting Services marks a great step forward in this field of activity. The conception of a uniform assessment of the functional abilities of the population as a whole, whether in terms of war requirements or of industrial potential, is striking enough to require no further elaboration.

ARMY PUBLICATIONS

Pulheems—System of Medical Classification for the Fighting Services, dated November, 1946.

The Application of the Pulheems System of Medical Classification to the Army (W.O. Code No. 1792—restricted).

These pamphlets are in the process of being rewritten, and it is hoped that the first, which deals with the medical aspect entirely, will be available for purchase at H.M. Stationery Office early this year.

I wish to express my thanks to the Director-General of the Army Medical Services, Lieutenant-General Neil Cantlie, C.B., *M.C.*, F.R.C.S., K.H.P., for permission to publish this paper. My gratitude is also due to the Director of Hygiene, Brigadier A. E. Richmond, C.B.E., K.H.S., and my colleagues Lieutenant-Colonel A. N. B. Odbert, O.B.E., R.A.M.C., and Major R. B. Stalbow, General List, for much valuable help and criticism in the presentation of this paper.

Offenders who are remanded on bail under provisions of Section 26 of the Criminal Justice Act, 1948, may now be sent to certified institutions or certified houses (among other places) for medical examination and report. The Mental Deficiency (Amendment) Regulations, 1948, which came into operation on Dec. 27, prevent such an offender being received in a certified institution or certified house which is already accommodating the full number of patients for which it has been certified as suitable unless the Minister consents to his reception.

"PALUDRINE" (PROGUANIL) IN PROPHYLAXIS AND TREATMENT OF MALARIAL INFECTIONS CAUSED BY A WEST AFRICAN STRAIN OF P. FALCIPARUM

BY

G. COVELL, M.D., D.T.M.&H., D.P.H.
W. D. NICOL, M.B., D.P.M., F.R.C.P.
P. G. SHUTE AND M. MARYON

(*From the Malaria Laboratory, Horton Hospital, Epsom, Surrey*)

"Paludrine" was first used for the treatment of human malaria at the Liverpool School of Tropical Medicine in 1945 by Maegraith and his colleagues, who published records relating to 22 patients naturally infected with West African strains of *Plasmodium falciparum*, 16 of whom were considered to be suffering from primary attacks. The dosage of paludrine administered varied from 50 to 600 mg. twice daily for 14 days. The clinical response was satisfactory in all cases, and was as rapid in those receiving 50 mg. of the drug twice daily as in those who were given a dosage ten times as great. Owing to difficulties in follow-up it was not possible to determine the radical cure rate (Maegraith *et al.*, 1945).

Subsequently an extensive series of prophylactic and therapeutic trials with paludrine on volunteers exposed to infection with New Guinea strains of *P. falciparum* and on troops suffering from malaria contracted in that area was undertaken by Fairley and his colleagues at the Land Headquarters Medical Research Unit, Cairns, Australia, on the same lines as those previously employed at this centre with mepacrine. Paludrine was found to act as a true causal prophylactic against infections due to New Guinea strains of *P. falciparum*. Radical cure was effected in 41 out of 41 natural and in 46 out of 47 experimentally induced sporozoite infections treated with a ten-days course of 100 mg. of the drug thrice daily. In most cases there was rapid clearance of asexual parasites from the peripheral blood, but, though the overt attack was readily controlled even by very low dosage, the clinical response was described as "not rapid." Gametocytes were not destroyed in the peripheral blood but were rendered non-infective to mosquitoes for a variable period, depending on the size of the dose administered (Fairley *et al.*, 1946).

Since the publication of the Liverpool and Cairns trials a number of prophylactic and therapeutic trials with paludrine have been carried out in India and in Malaya, with generally favourable results. The drug has proved exceedingly useful in both these countries, particularly among labour forces and village populations, where a single-dose treatment of 300 mg. has been generally adopted. It should be noted, however, that the great majority of the subjects treated have been semi-immunes, and there is little evidence regarding the radical cure rate. Chaudhuri (1948) drew attention to the existence in India of strains of *P. falciparum* infections from which are not radically cured by a dosage of 300 mg. of paludrine daily for ten days, and cited the case of a patient who experienced a second overt attack nine days after the completion of treatment and a third attack 11 days later. Other reports from clinicians practising in India and in Malaya indicate that for the treatment of *P. falciparum* infections in non-immune persons paludrine is not entirely adequate in the dosage originally recommended.

In Sardinia, Bettini (1948) treated 94 cases of *falciparum* malaria with 100 mg. of paludrine thrice daily for 10 days

followed by a weekly dose of 100 mg. for three months. The clinical response and clearance of parasites from the peripheral blood were satisfactory, but in 17 of the cases relapses* occurred within this period.

Widely divergent accounts regarding the efficacy of paludrine in the treatment and prophylaxis of malaria have emanated from different parts of Africa, including Kenya, Tanganyika, Rhodesia, Uganda, the Gold Coast, and Nigeria. Some of these have been favourable, whilst in others it has been alleged that the drug has proved unsatisfactory in the treatment of *P. falciparum* infections, in respect of both clinical response and radical cure, as well as for prophylaxis. The most frequent criticism has been that, owing to its slowness of action, serious symptoms have persisted in many cases for three or four days, sometimes longer, necessitating reinforcement of the treatment with mepacrine or quinine.

As the result of trials in the Belgian Congo, van Riel (1948) reported that in a dosage of 100 mg. thrice weekly paludrine failed to act as a causal prophylactic against *P. falciparum* in non-immune subjects constantly exposed to infection. This statement was based on the grounds that one out of 11 persons so treated developed an overt malarial attack on the last day of drug administration and four others did so shortly after this had been discontinued, under conditions precluding the possibility of reinfection It should be noted, however, that administration of the drug was discontinued approximately 40 hours after the last possible exposure to infection, a period which on Fairley's findings leaves little if any margin of safety and which can scarcely be regarded as sufficient to ensure adequate protection. The clinical response in 156 cases of *P. falciparum* malaria in African labourers treated with 100 mg. of paludrine thrice daily was reported by van Riel to be as satisfactory as that achieved by mepacrine or quinine, but the radical cure rate was not stated.

The investigations recorded below were undertaken in an endeavour to clear up some of the points at issue regarding the use of paludrine for the prophylaxis and treatment of infections with African strains of *P. falciparum*. The strain of parasite used was obtained from a native child resident in Lagos, Nigeria, in November, 1947, and has been maintained at Horton since that date by successive blood and mosquito inoculation. None of the subjects through whom the strain has been passed received paludrine, except the second in the series, who was given 300 mg. of the drug in a single dose on two successive days. The mosquitoes used for transmission were *Anopheles stephensi* (Type), a colony of which was established at Horton during the winter of 1947–8 from specimens imported by air from India. The subjects of the trials were patients in Horton Hospital, all of whom had undergone malaria therapy for neurosyphilis with the Madagascar strain of *P. vivax* or with European strains of *P. falciparum* nine or more years previously but had not been exposed to malarial infection of any kind in the intervening period.

Prophylactic Trials

Twenty-seven patients were arranged in groups as shown in Table I. The patients were infected once weekly over a period of six weeks,† alternate subjects under prophylaxis either being bitten by five to ten heavily infected mosquitoes or receiving by intravenous injection a suspension of the salivary glands of one heavily infected mosquito by the technique described by Shute (1937). Infections were given on a different day each week, so as to simulate as closely as possible conditions which might arise in nature. Drug administration was started three days before the first infection in each group, and was continued until six days after the last infection. One or more controls were infected from each batch of mosquitoes used during the course of the experiment. Blood examinations (thick smears) were made twice weekly as a routine, and daily in the case of any rise of temperature above the normal level.

TABLE I

Group	No. in Each Group	Drug Administered	Dosage
I	5	Paludrine	100 mg. daily
II	5	,,	50 mg. daily
III	5	,,	100 mg. twice weekly at 3 to 4 days' interval
IV	5	,,	300 mg. once weekly
V	1	Quinine hydrochloride	5 gr. (320 mg.) daily
	1		10 gr. (650 mg.) daily
VI (controls)	5	No drug	

Results

No member of any of the paludrine groups (I to IV) showed parasites in the peripheral blood either during the period of drug administration or subsequently. One member of Group II (50 mg. of paludrine daily) had intermittent pyrexia for four days, starting a fortnight after his first infection. Sub-inoculation of his blood into a non-immune subject proved negative. The donor was found to have only a trace of paludrine in his blood at this time, whereas a few days later the concentration of the drug was of the same order as that of the other four members of the group, the inference being that by some means he had avoided taking the drug regularly as prescribed. Despite the negative results of sub-inoculation and blood examination it is possible that the pyrexia was the result of a partially suppressed malarial infection, but in the circumstances stated this case cannot be regarded as a genuine breakthrough.

Neither of the two individuals under quinine prophylaxis (Group V) showed pyrexia or parasites in the peripheral blood while taking the drug. Both developed overt attacks of malaria after the drug had been discontinued, the first after the lapse of seven days and the second five days later. This is in accordance with the well-established fact that quinine is not a causal prophylactic of malarial infections, its action being suppressive only. All the five control cases developed overt malarial attacks within the normal incubation period, thus demonstrating that each batch of mosquitoes used was infective.

Ten weeks after the cessation of drug administration 18 of the 20 individuals who had been on paludrine prophylaxis were inoculated intravenously with sporozoites of the same strain of *P. falciparum*. All without exception developed overt attacks of malaria within a period of seven to ten days, thus proving their susceptibility to infection with the Lagos strain.

Three members of the laboratory staff were bitten repeatedly while handling heavily infected batches of mosquitoes throughout the period of the investigation, taking no precautions to avoid infection. Each took 200 mg. of paludrine in a single dose twice weekly at three to four days' interval. None of them developed malarial attacks. It is of interest also that two members of the staff who visited Nigeria in November, 1947, were inoculated intravenously in Lagos with a suspension of the salivary glands of a heavily infected specimen of *Anopheles gambiae* caught in a native hut. The species of parasite cannot be stated with certainty, but since the great majority of positive

*Throughout this paper the term "relapse" has been applied to any recrudescence of fever with demonstrable parasitaemia subsequent to the primary attack.

†Except the two individuals under quinine prophylaxis (Group V), who were infected three times only, over a period of three weeks.

blood smears examined at this time contained parasites of *P. falciparum* it is more than likely that they were infected with sporozoites of this species. They had each taken 100 mg. of paludrine daily until and including the day before infection, after which the drug was discontinued. Neither developed signs or symptoms of malaria.

From the evidence presented above paludrine has been shown to act as a true causal prophylactic against the Lagos strain of *P. falciparum* in each of the regimes under trial. It is considered, however, that non-immune persons residing in or visiting West Africa should be advised to take not less than 100 mg. of the drug daily for the prophylaxis of malaria. For semi-immune subjects, such as native labour forces and locally recruited Government employees, a weekly dose of 300 mg. is recommended. We do not regard the other two systems tested as offering a sufficient margin of safety.

Therapeutic Trials

Twenty-five patients were arranged in groups as shown in Table II. Each patient was infected by intravenous inoculation of a suspension of the salivary glands of two specimens from the same heavily infected batch of mosquitoes. Treatment was started in all cases as soon as the temperature reached 100° F. (37.8° C.), provided that parasites had also been seen in the peripheral blood (thick smear).

TABLE II

Group	No. in Each Group	System of Treatment
I	5	Paludrine 300 mg. once daily for 14 days
II	5	Paludrine 300 mg. twice daily for 7 days
III	5	Paludrine 300 mg. twice daily for 10 days, plus quinine hydrochloride 10 gr. thrice daily on the first day of treatment only
IV	5	Paludrine 300 mg. twice daily for 10 days, plus mepacrine 300 mg. thrice daily on the first day only
V	5	Quinine hydrochloride 10 gr. twice daily for 10 days

The results are summarized in Table III. The most striking features brought out by these results are: (1) the conspicuous failure of paludrine unaided to effect radical cure; (2) the absence of relapse following courses of paludrine reinforced with quinine or mepacrine on the first day of treatment, and of quinine alone; and (3) the rapid termination of the clinical attack effected by reinforcement of a paludrine course with mepacrine on the first day of treatment.

TABLE III

Group	Average Duration of Fever*	Average Duration of Parasitaemia* (Asexual)	Subsequent History
I (P. only)	76 hours	3·2 days	All 5 cases relapsed within 3 weeks and were treated with 300 mg. paludrine twice daily for 10 days. A second relapse occurred in one case
II (P. only)	68 ,,	3·0 ,,	Four out of 5 cases relapsed within 3 weeks and were treated with 300 mg. paludrine twice daily for 10 days. A second relapse occurred in 2 cases
III (P. plus Q.)	78 ,,	2·0 ,,	No relapse (observed 3 months)
IV (P. plus M.)	50 ,,	2·5 ,,	,, ,, ,,
V (Q. only)	55 ,,	2·5 ,,	,, ,, ,,

* After beginning of treatment.
P. = Paludrine. Q. = Quinine. M. = Mepacrine.

Effect of Paludrine on Gametocytes.—Gametocytes were observed, often in very large numbers, in the peripheral blood of eight of the nine patients who experienced relapses, for which they were treated with 300 mg. of paludrine twice daily for ten days. Mosquitoes were allowed to feed repeatedly on the two patients who showed the greatest density of gametocytes over a period of 24 days, but none became infected. By this time the gametocytes had become too scanty for infection to occur even had no drug been given.

Discussion

The chief objectives in the treatment of *P. falciparum* infections are: (1) Termination of the clinical attack with the least possible delay. In countries where malignant tertian infections are prevalent this is an essential requirement, particularly when, as often happens, the patient has been ill for some days before the beginning of specific treatment. (2) Prevention of relapses, which may be little less dangerous to life than the primary attack. (3) Sterilization of gametocytes for as long a period as possible. (4) Low toxicity on the part of the drugs used for treatment and for prophylaxis.

The investigations here recorded have confirmed the findings of others working in different countries that the action of paludrine on the clinical attack in malarial infections is generally less rapid than that of mepacrine or quinine, and have shown that, though it acts as a true causal prophylactic of the Lagos strain of *P. falciparum*, it cannot be relied upon, unaided, to effect radical cure of infections with that strain. When administered in sufficient dosage, however, it effectively sterilizes gametocytes for as long as these are present in the peripheral blood in numbers sufficient to infect mosquitoes, while its toxicity is of a lower grade than that of any other known antimalarial drug.

Mepacrine, when administered in the dosage now usually prescribed—i.e., starting with a "loading dose" of 600 to 900 mg. on the first day or first two days of treatment and continuing at 300 mg. daily for five to seven days—will effect a rapid termination of the clinical attack and a high rate of radical cure of *P. falciparum* infections. It does not, however, sterilize gametocytes, and its toxic effects, though of rare occurrence, are by no means negligible. This applies particularly to the so-called mepacrine psychosis, which may evoke symptoms of mental aberration or even of maniacal excitement. The yellow coloration of the skin which sometimes follows a course of mepacrine is an additional disadvantage.

Quinine, when administered in a daily dose of 20 to 30 gr. (1.3 to 2 g.) over a period of seven to ten days, will, like mepacrine, ensure in most cases a rapid termination of the clinical attack and a high radical cure rate. It has no effect on the infectivity of gametocytes. A greater disadvantage, however, is its long-recognized association with the precipitation of blackwater fever. Findlay and Stevenson (1944) have recorded a marked reduction in the incidence of this disease following the substitution of mepacrine for quinine in the treatment of *P. falciparum* infections among British troops stationed in West Africa.

We have shown that reinforcement of a course of paludrine 300 mg. twice daily with mepacrine 900 mg. given in three doses on the first day of treatment brings about rapid termination of the clinical attack and also results in a high rate of radical cure.* It does not seem likely that a single day's reinforcement with mepacrine will cause mental disturbances, which occur almost exclusively towards the end of a full mepacrine course or during the first week after this has been completed. Since paludrine in doses of 300 mg. twice daily for ten days

*It is possible that reinforcement with 600 mg. of mepacrine would prove sufficient for this purpose.

effectually sterilizes gametocytes, this course, reinforced with mepacrine in massive dosage on the first day of treatment, seems more likely to fulfil all the requirements listed above than any other form of treatment available. We would advise, however, that such a course be followed up by a maintenance dose of 100 mg. of paludrine daily for the ensuing six weeks, in order to cover the period during which *P. falciparum* relapses are most likely to occur. In endemic areas where strict paludrine prophylaxis is in force the patient would come under this regime automatically.

Summary

An account is given of a series of prophylactic and therapeutic trials with paludrine carried out at Horton Hospital, Epsom, against a strain of *P. falciparum* obtained from a native child resident in Lagos, Nigeria.

Paludrine was found to act as a true causal prophylactic of infections with this strain of parasite. The prophylactic dosage recommended for non-immune adults exposed to malarial infection in West Africa is 100 mg. daily.

Paludrine controlled the clinical attack caused by infections with this strain, but its action in this respect and in clearance of asexual parasites from the peripheral blood was somewhat less rapid than that of mepacrine or quinine.

Paludrine unaided failed to effect radical cure of infections with this strain, a finding in marked contrast with the results achieved by Fairley *et al.* (1946) in their researches on New Guinea strains of *P. falciparum*.

Radical cure of the Lagos strain of *P. falciparum* has apparently been effected with (*a*) 300 mg. of paludrine twice daily for 10 days, reinforced with 900 mg. of mepacrine given in three doses on the first day of treatment (6 cases); (*b*) 300 mg. of paludrine twice daily for 10 days, reinforced with 30 gr. (2 g.) of quinine hydrochloride given in three doses on the first day of treatment (5 cases); and (*c*) 10 gr. (650 mg.) of quinine hydrochloride twice daily for 10 days (5 cases).

Following a course of 300 mg. of paludrine twice daily for 10 days gametocytes were rendered non-infective to mosquitoes for as long as they continued to be present in the peripheral blood in sufficient numbers for infection to occur.

Reinforcement of a course of 300 mg. of paludrine twice daily for 10 days with 900 mg. of mepacrine administered in three doses on the first day of treatment shortened the average duration of pyrexia and clinical symptoms by approximately twenty-four hours.

It is considered that such a course, followed by a maintenance dose of 100 mg. of paludrine daily for the ensuing six weeks, would fulfil the main objectives in the treatment of *P. falciparum* malaria infections—namely, rapid termination of the clinical attack, a high radical cure rate, sterilization of gametocytes, and minimum risk of injurious side-effects.

REFERENCES

Bettini, S. (1948). *Rivista di Parassit.*, **9**, 107.
Chaudhuri, R. N. (1948). *Ind. Med. Gazette*, **83**, 225.
Fairley, N. H., *et al.* (1946). *Trans. R. Soc. trop. Med. Hyg.*, **40**, 105.
Findlay, G. M., and Stevenson, A. C. (1944). *Ann. trop. Med. Parasit.*, **38**, 168.
Maegraith, B. G., *et al.* (1945). Ibid., **39**, 232.
Riel, J. van (1948). *Ann. Soc. belge Méd. trop.*, **28**, 85.
Shute, P. G. (1937). *Ann. trop. Med. Parasit.*, **31**, 85.

The Secretary of State for Scotland has appointed Mr. T. D. Haddow to be an Under Secretary in the Department of Health for Scotland. Mr. Haddow, who is 35 years of age, was educated at Watson's College and Edinburgh and Cambridge Universities. He had the distinction of taking first place in the 1935 competition for entry into the administrative grade of the Civil Service. He was appointed to the Department of Health for Scotland in October, 1935, as an Assistant Principal, promoted to the rank of Principal in 1940, and to Assistant Secretary in 1943. He was closely associated with the preparatory work in connexion with the National Health Service. Under the auspices of the Commonwealth Fund of New York, Mr. Haddow is at present in the U.S.A. studying the administration of public health in that country, and he will complete these studies before returning to take up his new appointment.

INTRAVENOUS "PALUDRINE" (PROGUANIL)

BY

R. N. CHAUDHURI, M.B.Cal., M.R.C.P.Ed., T.D.D.Wales
Professor of Tropical Medicine

AND

H. CHAKRAVARTI, M.B.Cal.
Assistant Research Officer
School of Tropical Medicine, Calcutta

In the spring of 1947 we received a supply of paludrine acetate (soluble proguanil) for intravenous use in the treatment of malaria. This preliminary report is a record of its employment in 11 patients admitted to the hospital attached to this institution, one of them being transferred from another hospital. All were Indians, nine males and two females, ranging in age from 9 to 60 years. The duration of illness was four days or less in nine cases and about a week in two, but in none had any antimalarial treatment been given before admission. *Plasmodium falciparum* infection was predominant, being present in 8 cases, while two had *P. vivax* and one had mixed infection. Four patients were gravely ill with pernicious symptoms, four had heavy parasitic infection with frequent vomiting, while three had what may be called ordinary malaria without any complication.

Paludrine acetate* was supplied in 5-ml. ampoules, each containing 100 mg. of the drug. As it was sent to us for experimental trial there were no instructions regarding dosage, and so we had to proceed cautiously, starting with 25 mg. and increasing to 400 mg. in a single injection. In four cases paludrine was given both orally and intravenously.

Case Reports

Case 1.—A boy aged 14, weight 70 lb. (31.75 kg.), was admitted on April 16, 1947, for remittent fever of four days' duration with severe headache. On admission his temperature was 100.2° F. (37.9° C.). Liver and spleen were not palpable; blood showed *P. falciparum* rings. On the following day, while the temperature was 105° F. (40.6° C.), 25 mg. of paludrine was given intravenously. The blood pressure was 102/45 mm. Hg before and 104/50 five minutes after the injection. On the second day of the injection the temperature was almost normal, but next day it shot up to 104.5° F. (40.25° C.), and remained at about this level for five days and thereafter was of intermittent type. The blood was negative on the third day and

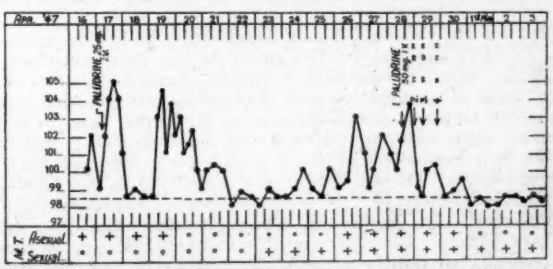


FIG. 1.—Temperature chart of Case 1

crescents appeared on the sixth day. On the ninth day, when the temperature was still high, *P. falciparum* rings reappeared in the blood and the spleen became palpable when 50 mg. of paludrine was given intravenously twice daily for two days. This controlled the fever in 60 hours and cleared the blood of asexual parasites in 48 hours (Fig. 1). The blood pressure

*Paludrine acetate has now been replaced by paludrine lactate, which is more soluble and less irritant. An ampoule of 2 ml. contains 100 mg. of the drug. We have used it intramuscularly with satisfactory results, which will be published later.

before and after the injections showed little or no variation. The patient was subsequently under observation for eight months, during which period he had no recurrence of fever.

Case 2.—A man aged 50, weight 90 lb. (40.8 kg.), was admitted on April 22, 1947, with a history of relapsing *P. vivax* malaria, the duration of the present attack of fever being two days. Blood showed *P. vivax* rings, schizonts, and gametocytes in large numbers. The temperature on admission at 10 a.m. was 99.4° F. (37.4° C.), but it shot up to 106° F. (41.1° C.) at 2 p.m., when 50 mg. of paludrine was given intravenously followed by one tablet (100 mg.) thrice daily for five days. The blood pressure was 170/85 mm. Hg before and 150/80 after the injection. The temperature was slightly raised on the following day and became normal on the day after, while the blood was clear of asexual parasites in 48 hours.

Case 3.—A man aged 34, weight 100 lb. (45.35 kg.), was admitted on May 2, 1947, with a history of fever on alternate days. The spleen was palpable and blood showed *P. vivax* parasites in large numbers. On the 6th he was given three injections of paludrine, 100 mg. each, at intervals of four hours, with a satisfactory clinical response, the temperature becoming normal in 24 hours and the blood parasite-free in 72 hours.

Case 4.—A man aged 60, weight 88 lb. (39.92 kg.), was admitted on July 23, 1947, as a case of enteric fever of about ten days' duration. He was looking toxic and dehydrated, and his general condition was low. As he was also semiconscious it was difficult to feed him. The spleen was palpable and the blood showed *P. falciparum* rings +++ and scanty crescents. Paludrine 100 mg. was given intravenously at 2, 6, and 10 p.m. and 2 a.m., and was well tolerated. The blood pressure before and after each injection was as follows:

	Before	After
1st injection	78/55 Hg	80/58 Hg
2nd "	70/50 Hg	75/55 Hg
3rd "	80/55 Hg	80/60 Hg
4th "	80/55 Hg	80/58 Hg

The patient became fully conscious on the following day and took food much better. The temperature became normal after 32 hours and no asexual parasites were seen after 48 hours, while crescents persisted. There was slow but steady improvement in the general condition, but after about three weeks, while still in the hospital, he had a relapse, for which paludrine was given in doses of one tablet thrice daily for ten days with good response. He was followed up for the next six months, during which period he had no fever.

This was a serious case of *P. falciparum* malaria in an old man with symptoms simulating typhoid fever. Four intravenous injections of paludrine, 100 mg. each at intervals of four hours, had an immediate response.

Case 5.—A man aged 20, weight 90 lb. (40.8 kg.), was admitted to the Medical College Hospital under Dr. J. C. Banerjee on Aug. 23, 1947. The history was that he had a sudden attack of fever on the 20th but carried on with his work until the 22nd. On the following day his fever was high, and he had seven or eight bilious vomits and five or six loose stools with mucus. His condition rapidly deteriorated; he became unconscious at 3 p.m. and was brought to the hospital at about midnight. Blood examination showed *P. vivax* rings. He was given an intravenous injection of paludrine, 100 mg., followed by two tablets of the drug by nasal tube thrice daily for five days. After two more paludrine injections on Aug. 27 and 28 the temperature became normal, but he still remained almost unconscious. On the 30th he was transferred to this hospital along with other patients to make room for casualties due to communal riots in the city. On examination the patient was in a lethargic state, being unable to hear, talk, eat, or even recognize his own mother. At times he was restless, but there was no rigidity or paralysis. Reflexes were normal, pupils equal and reacting, and fundus oculi healthy. The spleen was palpable and the blood pressure 85/55 mm. Hg. Stools passed involuntarily. Blood showed crescents daily from Sept. 5 to 17, and also scanty *P. falciparum* rings on the 8th and 9th, but with no rise of temperature. No antimalarial drug was given and he was fed by nasal tube. After ten days of vegetative existence he began to improve mentally and physically and gradually regained consciousness. He could then sit up and take his food himself and speak, though indistinctly, but developed volitional tremors. At this stage he was taken back to the Medical College Hospital, where he made good progress except for an attack of *P. vivax* malaria. He visits us periodically, and up to now has been normal.

This patient was desperately ill with cerebral malaria and had apparently both *P. falciparum* and *P. vivax* infections, which responded well to paludrine given intravenously and by the nasal route; but symptoms suggestive of encephalitis developed and he remained in that stage for several weeks. These symptoms appeared to be a sequel of cerebral malaria and not due to large doses of paludrine. It is of interest, however, to note that, despite this dosage, the patient had an early *P. falciparum* relapse without fever and later *P. vivax* relapse with fever while in hospital.

Case 6.—A man aged 40, weight 120 lb. (50.43 kg.), was admitted on Sept. 30, 1947, with a history of high continuous fever for three days, with intense headache and frequent vomiting. His general condition was low, temperature 102.4° F. (39.1° C.), spleen just palpable, and tongue coated and dry. The blood showed *P. falciparum* rings +++. An intravenous injection of 200 mg. of paludrine was given immediately, followed by two more injections of 100 mg. each at intervals of four hours. The temperature became normal three days after the injections, although the blood was negative on the second day.

Case 7.—A man aged 30, weight 75 lb. (34 kg.), was admitted on Oct. 3, 1947, for remittent fever and repeated vomiting of about a week's duration. The spleen was palpable and the blood showed *P. falciparum* rings ++. Soon after admission he had a severe rigor, which was considerably relieved by an intravenous injection of 5 ml. of 10% calcium gluconate. As he was unable to retain anything by mouth he was given an intravenous injection of 300 mg. of paludrine. On the third day he became afebrile and the blood was free of rings.

Case 8.—A man aged 20 was admitted on Oct. 9, 1947, with fever and frequent vomiting that started the same morning. He had had *P. vivax* malaria three weeks previously and been treated with "chloroquin." The spleen was just palpable and blood showed *P. falciparum* rings ++. Next day, when the temperature was 105° F. (40.6° C.), he was given an injection of 400 mg. of paludrine, followed orally by 100 mg. thrice daily for three days. On the 13th he was afebrile and the asexual parasites had disappeared. No untoward effect was observed, and the blood pressure before and after the injection was 102/65 and 105/65 mm. Hg.

Case 9.—A woman aged 25, weight 87 lb. (39.46 kg.), was admitted in the evening of Oct. 9, 1947, with a history of high fever for four days and of unconsciousness the night before. On admission her temperature was 103° F. (39.4° C.). She was conscious but dazed, and complained of intense headache and frequent vomiting. The spleen was palpable and blood showed *P. falciparum* rings ++. Paludrine, 400 mg., was given intravenously on the following day. After about 6 ml. had been injected rather rapidly she complained of a hot sensation all over the body and began to sweat. This symptom passed off soon and the injection was completed. The blood pressure before and after the injection was 120/65 and 120/70 mm. Hg respectively. Subsequently she complained of pain along the course of the injected vein up to the axilla, and this persisted for about four days. The temperature became normal in 56 hours and the blood free of parasites in 28 hours.

This patient had vasomotor reactions after part of the injection given rapidly. Probably she also had some local phlebitis.

Case 10.—A boy aged 15, weight 82 lb. (37.19 kg.), was admitted on Oct. 9, 1947, for fever and excessive vomiting for two days. His condition on admission was low; he was very thirsty but was unable to retain anything. The pulse was fast and soft, urine scanty, and temperature 100.4° F. (38° C.). The spleen was palpable, and the blood showed *P. falciparum* rings ++. Paludrine, 400 mg., was given intravenously, followed by one 100-mg. tablet thrice daily for four days. There was a striking improvement in the patient's condition; the temperature was normal and the blood became parasite-free after 36 hours.

Case 11.—A girl aged 9 was admitted on Oct. 31, 1947, with a history of high continuous fever for three days, starting with

chill and rigor and persistent vomiting. She had been delirious and restless on the previous night, and on admission was semi-conscious, with a temperature of 104° F. (40° C.), rising to 106° F. (41.1° C.) soon after. The pulse was feeble and very rapid, about 160 (?) a minute, while the respiration was hurried and laboured. A few scattered rales and rhonchi were heard in the lungs. The heart sounds were short and weak; blood pressure 120/60 mm. Hg. The blood showed *P. falciparum* rings. She was immediately given an injection of 100 mg. paludrine; five minutes after the injection the blood pressure was 122/60. Another injection was given after four hours, and the treatment also included sponging and the administration of oxygen, fluids, glucose, and nikethamide injections. The condition steadily deteriorated, and she died 16 hours after admission.

Discussion

Dosage.—Antimalarial drugs are given parenterally only when for any reason, such as loss of consciousness or persistent vomiting, the patient is unable to swallow or retain them, and as soon as these symptoms are controlled the drugs are continued orally. These indications were present in 8 out of 11 cases in this series. Paludrine injections were first tried in two uncomplicated cases of malaria. In one, that of a boy of 14 with *P. falciparum* infection, a dose of 25 mg. had no effect on the temperature, which continued unabated for several days, nor on the parasite, crescents appearing on the sixth day and *P. falciparum* rings reappearing on the ninth day. Both, however, were controlled with 200 mg. of paludrine (50 mg. given twice a day for two days) in about 48 hours after the injection. The other case was heavily infected with *P. vivax* malaria and was treated with 50 mg. intravenously, followed by oral paludrine, one 100-mg. tablet thrice daily for five days. This brought the temperature to normal and cleared the blood of parasites within 48 hours of the injection.

As there were no untoward effects from these injections it was decided to increase the dose in the cases that came afterwards. Most of them happened to be *P. falciparum* infections complicated by cerebral or gastro-intestinal symptoms. At first the dose was 100 to 200 mg. repeated two to three times a day at four-hourly intervals; later it was one of 300 mg. and ultimately 400 mg. These patients therefore received by injection, either in a single dose or in repeated doses, 300 to 600 mg. of paludrine. To be on the safe side, these injections were accompanied in four cases by paludrine orally.

Effect on Temperature and Parasites.—The immediate effect of the increased dosage in 7 out of 9 patients was striking. In Cases 3, 4, 6, 7, and 9, which had injections only, the blood became clear of parasites in 24 to 48 hours and the temperature became normal in 32 to 72 hours; there was also improvement in their general condition. This was especially noticeable in Case 4, that of a man of 60, who was semiconscious and in a toxic state on admission. After receiving 400 mg. in twelve hours he soon became fully conscious and began to take his food much better. Cases 8 and 10, which had oral paludrine in addition to injections, showed equally good response even before the drug by mouth could have exerted its full effect.

Paludrine had no such effect in the remaining two cases. One of them (Case 5) had typical cerebral malaria, and, though the mixed *P. falciparum* and *P. vivax* infection was controlled by giving the drug intravenously as well as by the nasal route, he remained unconscious for some time and developed signs indicative of encephalitis; but eventually he recovered fully in spite of subsequent relapses. The other case (No. 11) was that of a girl of 9 with hyperpyrexia and delirium from *P. falciparum* infection who was admitted in a state of failing circulation. Paludrine by injection (two doses of 100 mg.), with stimulants, had no effect whatsoever, and she died within 16 hours of admission. The patient was brought in in a moribund state, and it is difficult to judge the effect of the drug in such a case.

Other Effects.—Practically all the patients were weak and undernourished before the present attack of malaria. Only one of them weighed above 100 lb. (45.35 kg.). One was below 10 years of age and two were 50 years or over. The blood pressure was low in two cases—viz., 78/55 and 85/55 mm. Hg. Yet paludrine had no adverse effect, and the blood pressure remained remarkably constant even after three or four injections given at four-hourly intervals. One patient (Case 9) complained, while the injection was being given, of a hot sensation all over the body and began to sweat; these symptoms soon passed off, and the blood pressure remained unaffected. Subsequently she complained of pain along the course of the injected vein up to the axilla, which lasted for four days. Later we encountered another patient, not included in this series, who also complained of similar pain, which persisted for five or six days after the injection of 100 mg. The pain was mild but uncomfortable, and was possibly due to some local phlebitis.

Summary

Paludrine acetate (soluble proguanil) was tried intravenously as an experimental measure in a series of 11 cases of malaria, all of which except two had *P. falciparum* infection. The majority of the patients had either cerebral or gastro-intestinal complications and were not suitable for oral medication. Four of them were gravely ill.

Doses varied from 25 to 400 mg., and were repeated in a few cases. The total amount of paludrine injected ranged from 200 to 600 mg. per case.

This series was too small for determination of the optimum dose, but in the majority of cases a dosage of 200 to 400 mg. controlled the temperature and cleared the peripheral blood of asexual parasites in two to three days.

One patient admitted in a moribund state died. Another patient, with typical cerebral malaria, remained unconscious for several days and later developed signs and symptoms of encephalitis, from which, however, he recovered completely.

The injections were well tolerated, but one patient (and another not included in this series) had some phlebitis of the injected vein, which subsided in a few days.

Our thanks are due to Messrs. Imperial Chemical Industries (India), Ltd., for the supply of paludrine acetate; to Dr. J. C. Banerjee, of the Calcutta Medical College, for information about Case 5; and to the Indian Research Fund Association for a grant to carry out clinical trials with recent antimalarials.

In the annual report of the Central Midwives Board for the year 1947–8 reference is made to the changes and improvements which have been brought about in recent years in the midwifery services of the country. Revision of the rules has been considered, and the Board has come to the conclusion that while some of the rules are still necessary they should be phrased in such a way that "they indicate a general standard of professional work which it is desirable to maintain rather than set out in precise detail the methods by which such a standard should be attained." During the year the Board decided to incorporate training in analgesia in the ordinary syllabus of training for a pupil midwife. Up to March 1, 1948, some 11,759 midwives possessed either the Board's certificate of proficiency or a certificate issued by a training institution. The Royal College of Obstetrics and Gynaecology was asked by the Board to report on the suitability of trichlorethylene as an analgesic for use by midwives, but the Council of the Royal College was unable to recommend that this substance should be used by midwives without supervision. The number of midwives who were practising in 1947 was 17,400. This maintains the steady increase recorded since 1942, when the figure was 15,615. The number of pupil midwives who were successful at the first examination was a record—3,832 compared with 3,486 in 1946. Wastage during training averaged 10.4% of the registrations. It is interesting that for the first time since 1902 there was no longer any midwife practising out of the 12,500 untrained women who were admitted to the Roll by virtue of having been in *bona fide* practice as midwives for a year or more before the passing of the Midwives Act, 1902.

PLASMA-CELL MASTITIS

REPORT OF A CASE WITH BILATERAL INVOLVEMENT

BY

MAX CUTLER, M.D.

(*From the Chicago Tumor Institute*)

Since plasma-cell mastitis was first described (Cheatle and Cutler, 1931) this peculiar inflammatory condition of the breast has become a subject of increasing interest. The fact that fewer than fifty cases are recorded in the literature under this title attests to the rarity of the disease. Its importance lies in its marked similarity to cancer. In fact, until recently radical mastectomy was almost invariably performed without biopsy because the clinical picture seemed so classical.

The purpose of this communication is to review the literature and report a case with bilateral involvement, an aspect which so far as I am aware has not been previously recorded.

Case Report

A married woman* aged 37, with two children, aged 5 and 7, was first seen on Oct. 28, 1932. Two weeks previously she felt a sudden pain in the right nipple accompanied by swelling and tenderness of the right breast. Three days later the swelling, pain, and tenderness diminished and the patient felt a mass in the centre of the breast.

Examination disclosed the breast to be considerably larger than the left, and the surface temperature was raised. In the centre was a firm solid movable mass about 8 cm. in diameter attached to the overlying skin. Several enlarged movable lymph nodes were present in the right axilla. The left breast seemed normal. A diagnosis of diffuse duct carcinoma was made and, because of the possibility of inflammatory carcinoma, preoperative irradiation was given as follows: right breast, 16,000 mg.-hours with 4 g. of radium, filtration 1 mm. platinum, distance 6 cm. through a round portal 10 cm. in diameter—4,000 mg.-hours for four days. Right axilla, 12,000 mg.-hours with 4 g. of radium, filtration 1 mm. platinum, distance 10 cm. through a round portal 10 cm. in diameter—4,000 mg.-hours daily for three days. The last radiation treatment was given on Nov. 2, 1932. Several days after completion of treatment the tumour began to regress rapidly. The patient was scheduled for radical mastectomy on Nov. 8, 1932.

In consultation with Dr. Richter just before the operation I suggested that the clinical picture, especially the rapid regression under irradiation, raised doubts about the diagnosis, and it was decided to perform a biopsy. The residual mass was excised and showed no evidence of carcinoma. The gross character of the lesion was most unusual. There were several small soft semi-fluid yellowish foci having a xanthomatous appearance, and numerous dilated ducts which exuded a brownish creamy material. Microscopically, foci of lymphocytes and solid masses of plasma cells with occasional foreign-body giant cells were seen, but no signs of carcinoma. Simple mastectomy was performed with the same gross and microscopical findings.

On July 6, 1939, six years and eight months after removal of the right breast, the patient complained of pain, tenderness, and nodularity in the left breast which recurred periodically at monthly intervals. These episodes corresponded to the menstrual cycle, although menstruation had ceased some years before in connexion with a hysterectomy. The ovaries were not removed. Examination disclosed that the left breast was enlarged, tender, and the seat of diffuse nodularity. In July, 1946, Dr. Richter performed a local excision. The gross and microscopical features of the specimen were those of plasma-cell mastitis.

Comment

This case presents several interesting and unusual features —the involvement of the second breast almost seven years after the first, the cyclic periodic increase and recession of symptoms, and the marked radiosensitivity of the lesion. The clinical and pathological picture which created a problem in diagnosis and treatment is best presented by the following notes I made on the morning of Nov. 8, 1932, the day of the first operation.

"Just before operation, in conversation with Dr. Richter, it was my opinion that there was some doubt about the presence of cancer, and I recommended local excision of the residual mass and frozen section. This was done. The gross character of the lesion was most peculiar, there being several areas of soft semi-fluid xanthomatous foci, also numerous dilated ducts exuding a brownish creamy material. There were no definite chalky streaks as one finds in carcinoma. Frozen sections failed to show definite evidence of carcinoma. Microscopical examination shows numerous foci of plasma cells and lymphocytes with occasional giant cells. It is my opinion that we are dealing with plasma-cell mastitis. It is interesting to note, on reviewing the history, that the condition started with acute symptoms consisting of sharp pain at night and that upon examination there was elevation of surface temperature over the breast. It is also important that the whole duration of this lesion was only two weeks. Furthermore, the very marked and rapid diminution in size of the mass following irradiation is more in favour of an inflammatory process. All the evidence favours a benign lesion."

Historical

In 1925 Ewing began to call attention to an unusual lesion of the breast which presented the gross and microscopical features of a curious inflammatory process. Almost without exception a radical operation had been performed under a clinical diagnosis of cancer. Because of the presence of solid masses of plasma cells beyond those seen in the usual inflammatory lesions, Ewing suggested the name "plasma-cell mastitis." I was associated with Ewing in the laboratory of the Memorial Hospital at the time and undertook to study the clinical picture associated with this condition; I found in the records of the Memorial Hospital only ten cases. The clinical features associated with this pathological state were so striking as to make it obvious that we were dealing with a more or less specific clinical and pathological entity. The results of this study were published by Cheatle and Cutler in 1931.

In 1933 Adair published a detailed study of the same cases and reached essentially similar conclusions. Adair suggested that the lesion may be precancerous and advised local excision as the best treatment. In the same year I reported the case of a woman aged 50 with the classical clinical signs of the disease (Cutler, 1933). Eight weeks after the onset a residual tumour mass was excised which showed the typical gross and microscopical features of plasma-cell mastitis. In 1939 Rodman and Ingleby reported a case which showed marked shock and toxaemia after radical breast amputation under an erroneous diagnosis of cancer. They consider that the presence of colostrum-like cells and fatty acid crystals suggests that the disease may be due to the action of enzymes causing a splitting of milk-like substances secreted under certain conditions in breasts of non-pregnant women. These studies, they think, point to the possibility that the products of milk disintegration may constitute the causative agent.

Cromar and Dockerty (1941) reported twenty-four cases seen over a period of thirty years in the Mayo Clinic. A clinical diagnosis of cancer had been made in seventeen of the cases. The low incidence of the disease was emphasized by these authors and by Harrington (twenty-four cases of plasma-cell mastitis among 12,000 breast cases). In 1943 Payne, Strauss, and Glasser reported two cases under the title of "mastitis obliterans" and presented their reasons for preferring this term to that of plasma-cell mastitis. The same year Lübschitz (1943) reported the case

*This patient was referred to me for consultation by Dr. H. M. Richter, through whose courtesy her case is reported.

of a patient who died in shock twenty-four hours after radical mastectomy. A biopsy had been erroneously interpreted as cancer, hence the radical operation. In 1944 Parsons, Henthorne, and Clark found five cases of plasma-cell mastitis among 1,500 breast specimens. Two of the cases are reported with clinical data. Gaston (1947) added three new cases. One patient had a bloody discharge from the nipple and in another there was a coexistent comedo-carcinoma with metastasis to axillary lymph nodes. Gaston suggests that while plasma-cell mastitis is usually benign the disease has malignant potentialities and can develop into either a comedo-carcinoma or a malignant plasmocytoma.

Related Conditions

In 1931 I searched the literature for references to acute and subacute inflammation of the non-lactating breast with the view of finding examples of plasma-cell mastitis reported under other titles. I found the case presented by Courtin (1900) before the Bordeaux Medical and Surgical Society in 1899. The patient was 50 years of age and the menopause had occurred four years previously. The tumour had been present for three months and showed most of the classical features of cancer. It was firm and fixed to the skin. The nipple was retracted and the axillary lymph nodes were enlarged. The tumour was, however, exquisitely tender, and the skin was reddened and warm. The treatment consisted of local hot applications. After four weeks the tumour had disappeared and there was no evidence of disease. In the discussion Coquet referred to a similar case which he had observed.

In 1932 Cohn and Bloodgood reported a series of cases of non-suppurative chronic lactation mastitis, some of recent origin, others occurring months or years after pregnancy. Microscopical study of the sections revealed signs of residual lactation in all the cases.

In 1909 Ingier described a low-grade inflammatory lesion of the breast under the term "mastitis obliterans." From a review of the case, however, it is clear that, although the microscopical features have some resemblance to plasma-cell mastitis, the clinical picture is totally different. Thus the patient developed an abscess in a lactating breast unlike plasma-cell mastitis. This clinical picture generally does not simulate mammary cancer.

In the case reported by Hoerz (1910) as mastitis obliterans a tumour mass developed following trauma. This too is not the clinical picture of plasma-cell mastitis, but rather of traumatic fat necrosis. In 1933 Schultz reviewed the earlier German cases and added a case of his own under the term "mastitis obliterans."

From an analysis of the published data it seems clear that some of the cases published as "mastitis obliterans," such as those of Ingier and of Hoerz, have no real similarity to plasma-cell mastitis, at least clinically, whereas others, such as those reported by Payne, Strauss, and Glasser, represent the same condition that we call plasma-cell mastitis.

The case published by C. W. Cutler (1934) is disquieting. His patient was a woman aged 49. Local excision was performed for a tumour of the left breast, and a microscopical diagnosis of plasma-cell mastitis was made. Nine months later a growth with a similar microscopical structure appeared in the right vocal cord, and subsequently similar lesions appeared in the sterno-clavicular joint, upper portion of left breast, and right antrum. The question arises whether this is a true example of plasma-cell mastitis or one of plasmocytoma. The question must be left open for the present, but the weight of evidence favours the latter diagnosis.

Certain conditions which have some similarity to plasma-cell mastitis and from which it must be distinguished are: lactation mastitis with or without abscess formation, traumatic fat necrosis, and plasmocytoma. Diffuse duct carcinoma, especially when associated with inflammatory signs, has already been noted.

Distinguishing Features

Clinical Features.—A breast which is not the seat of lactation may become acutely inflamed. The onset is sudden, with pain, tenderness, and redness of the skin. At first the whole breast is swollen and the axillary nodes are enlarged and tender. Usually there is some rise in temperature and sometimes there are chills. A creamy discharge from the nipple is not uncommon. The acute symptoms soon begin to subside, and as time progresses the process enters the second or subacute stage. In this interval the pain and tenderness diminish and the swelling of the breast decreases, leaving a diffuse nodularity. After a relatively short period the subacute signs disappear and the disease enters a chronic stage, which is generally prolonged. When all the acute and subacute signs of inflammation have disappeared there remains a discrete, hard, solid residual mass with attachment to the overlying skin and often retraction of the nipple. The axillary nodes are usually enlarged and firm. It is during the latter part of the subacute stage and more particularly during the third or chronic stage that the breast presents the classical clinical picture of mammary cancer, rendering a diagnosis of cancer almost imperative, and it is only by eliciting from the patient the details of the initial inflammatory phases of the disease that an error in diagnosis is avoided and the patient saved from a radical mastectomy.

Gross Features.—On cross-section one sees numerous dilated ducts and minute cysts which under pressure exude a thick creamy puriform material. The fat, fibrous tissue, and epithelial elements show a peculiar induration. The tissue has an unusual pinkish inflammatory appearance. There are radiating strands of dense translucent fibrous connective tissue. In some portions there may be soft semi-necrotic greyish areas and xanthomatoid foci, 1 to 3 mm. in diameter, often projecting from the cut surface. The induration and resistance of the tissues simulate carcinoma, but even in the most dense portions one fails to find the classical cicatricial tissues or chalky points that are characteristic of carcinoma. Furthermore, the process is diffuse and does not form a definable tumour that can be limited from the remainder of the breast.

Microscopical Features.—The affected portions of the breast exhibit an active acute and subacute exudative inflammation with numerous leucocytes, lymphocytes, and plasma cells. The process is diffuse and involves both the glandular and the interstitial tissues. The exudate is especially prominent around the ducts and acini, where the cellular reaction may consist almost exclusively of plasma cells. Foreign-body giant cells are often encountered in the centre of these foci. In some instances they are numerous and in others they are few or altogether absent. The dilated ducts are filled with and distended by desquamated epithelial debris. The epithelial cells undergo an intense hyperplasia, which may be so pronounced as to give rise to a suspicion of carcinoma. In the frozen section such areas can be very confusing and may lead to a diagnosis of carcinoma.

Diagnosis

The diagnosis is comparatively simple if the patient is examined during the first or acute stage. In the later stages, when the inflammatory signs have subsided, diagnosis is more difficult and errors are common. The most important

aid in differentiating this disease from cancer is to recognize the acute onset and subsequent clinical course. In plasma-cell mastitis the initial picture is that of an acute or subacute inflammation which appears suddenly and subsides rapidly. The process regresses steadily, whereas in carcinoma the process is reversed. The disease begins locally and extends progressively. A single examination is generally inadequate, for only by several examinations can one determine whether the disease is progressing or regressing. This is the most important single factor in the differential diagnosis.

Plasma-cell mastitis has to be distinguished from (*a*) inflammatory carcinoma, (*b*) diffuse duct carcinoma, and (*c*) traumatic mastitis. The initial stages of plasma-cell mastitis resemble inflammatory carcinoma; in the latter state, however, the carcinomatous invasion of the subdermal lymphatics gives rise to an irregular ridge-like thickening of the skin which is not present in plasma-cell mastitis. Diffuse duct carcinoma complicated by inflammation may simulate plasma-cell mastitis, but the disease process is diametrically opposite in the two conditions, one being steadily regressive, the other steadily progressive. Traumatic mastitis is differentiated by the history of trauma and the classical transillumination findings.

There are two pitfalls in the microscopical interpretation, and both apply specially to the examination of frozen sections, in which the fixation is generally inadequate. The intense epithelial hyperplasia often appears to have invaded structures outside normal boundaries. Paraffin sections of the same areas show that the masses of cells are actually confined within normal boundaries of ducts and acini, yet the picture can be so confusing that errors are sometimes made by the most expert. Another source of confusion is that the plasma cells may be so large and oedematous that in frozen sections they resemble anaplastic malignant epithelial cells.

Prognosis and Treatment

This curious unexplained inflammatory process tends to spontaneous regression and resolution, although a remnant often remains for a long time. The possibility that the disease may be precancerous has to be considered, but the clinical evidence is rather against this theory. I have observed one example which was suggestive of a relationship between plasma-cell mastitis and cancer. Adair points out that the time factor has to be considered, and it may well be that further observations will tend to establish a closer relationship between the two states.

The differential diagnosis between the early stages of plasma-cell mastitis and diffuse duct carcinoma with or without inflammatory signs is sometimes difficult. In order to avoid undue delay in establishing the diagnosis, it seems best to perform biopsy early. In former publications I was rather against biopsy during the early acute stage of the disease, but subsequent experience leads to the opinion that, generally speaking, less harm is done by a carefully performed but adequate biopsy than might be done by delaying a diagnosis of cancer. If the inflammatory process is definitely subsiding there would seem to be an advantage in postponing biopsy for a short period.

The safest treatment during the chronic stage, when the lesion is localized, is to remove the diseased area surgically. If most or all of the breast is involved and the inflammatory signs have disappeared simple mastectomy is indicated. During the acute and early subacute stages, the diagnosis having been established microscopically, irradiation should be given, with the reasonable expectation that the lesion will regress and become more localized. Surgical removal of the remnant can then be performed. The possibility that irradiation alone will suffice has to be considered, but until more cases have been studied over long periods surgical removal, alone or combined with irradiation, constitutes the safest course to pursue.

Summary and Conclusions

Plasma-cell mastitis is a clinical pathological entity. It is a peculiar inflammatory condition of uncertain aetiology. Its practical importance lies in the fact that it simulates cancer so closely that in the past it has almost always been treated by radical mastectomy. Since the onset and the course of the disease are highly characteristic and unlike those of cancer, a distinction is generally not difficult if one keeps the possibility of this condition in mind and if one elicits a careful history in every case of suspected mammary cancer. As regards treatment, the safest course to pursue after establishing the diagnosis by adequate biopsy is surgical excision during the later stages, when the lesion is localized, and irradiation during the acute or subacute stages followed by conservative surgical excision of the remnant.

A case of plasma-cell mastitis with bilateral involvement is reported in which irradiation demonstrated the lesion to be highly radiosensitive. So far as I know, no example of bilateral involvement has hitherto been recorded under this title.

References

Adair, Frank E. (1933). *Arch. Surg.*, **26**, 735.
Cheatle, G. L., and Cutler, M. (1931). *Tumors of the Breast*, p. 298, Arnold, London.
Cohn, L. C., and Bloodgood, J. C. (1932). *Amer. J. Cancer*, **16**, 487.
Courtin (1900). *Bull. Mém. Soc. méd. chir. Bordeaux*, p. 292.
Cromar, C. D. L., and Dockerty, M. B. (1941). *Proc. Mayo Clin.*, **16**, 775.
Cutler, C. W. (1934). *Ann. Surg.*, **100**, 392.
Cutler, M. (1933). *J. Amer. med. Ass.*, **101**, 1217.
Gaston, E. A. (1947). *Surgery*, **21**, 208.
Hoerz (1910). *Beitr. klin. Chir.*, **70**, 682.
Ingier, Alexandra (1909). *Virchows Arch.*, **198**, 338.
Lübschitz, K. (1943). *Acta radiol., Stockh.*, **24**, 403.
Parsons, W. H., Henthorne, J. C., and Clark, R. L., jun. (1944). *Arch. Surg.*, **49**, 86.
Payne, R. L., Strauss, A. F., and Glasser, R. D. (1943). *Surgery*, **14**, 719.
Rodman, J. S., and Ingleby, H. (1939). *Ann. Surg.*, **109**, 921.
Schultz, A. (1933). *Handbuch der Speziellen Pathologie*, VII, 2, 145. Julius Springer, Berlin.

TWO COMMON NON-MALIGNANT CONDITIONS OF THE BREAST

THE CLINICAL FEATURES OF CYSTIC DISEASE AND THE PAIN SYNDROME

BY

DAVID H. PATEY, M.S., F.R.C.S.

Surgeon, Middlesex Hospital

The clinician tends to divide pathological conditions of the breast into two big groups: a group composed of well-defined pathological entities such as abscess, fibro-adenoma, or carcinoma; and a vague, ill-defined group with varying and indefinite symptoms and signs which he tends to lump loosely together under some such title as chronic mastitis. Owing to confusion which sometimes exists about this latter group I have thought it worth while to describe the two common non-malignant conditions of the breast as I see them clinically. I have also reviewed the literature in broad perspective to show how some of the ideas on this group of disorders have arisen. I would like to support the plea of Cheatle for the abolition of the term "chronic mastitis," which has lost almost all precision and value; its sole remaining virtue is that no one can agree on a term to replace it. Deaver and McFarland in 1918 were able to collect no fewer than 23 different terms, and many more have been added since. Rather than attempt to burden the literature with still further terminologies I have thought it

best to rely on a purely factual descriptive term for each of the two main varieties of disorder met with.

There are two common non-malignant conditions of the breast met with clinically. The first is a condition with objective clinical signs—*cystic disease of the breast*; the second is a subjective disorder, the one symptom common to all cases being pain, and therefore it is best labelled the *pain syndrome*.

Cystic Disease of the Breast

Cystic disease of the breast is most commonly met with clinically between the ages of 40 and 50; it may be seen in the late thirties or early fifties, but it is rare for it to develop much earlier or much later. Far and away the commonest clinical picture is that of the *apparently solitary cyst*. A woman without any pain or other premonitory symptoms suddenly happens to feel a lump in her breast. In some cases the patient feels convinced that the lump was not there a short time before, and that it came up suddenly.

On examination the breasts appear normal in all respects on inspection and palpation except for the presence of the lump—hard, smooth, rounded, and with a characteristic dome-shaped top—of a size usually between ¾ in. (1.9 cm.) and 2 in. (5 cm.). Elasticity and fluctuation are exceptional. There may be a faint suggestion of lobulation in the form of a slight groove, but not nearly of the degree met with in a fibro-adenoma. There is no skin dimpling, nor are there other infiltrative signs. The diagnosis is established by aspiration, when anything from 2 ml. to 20 ml. of watery fluid, greyish green by reflected light and reddish brown by transmitted light, is obtained. Following aspiration the lump completely disappears and the breast returns to normal, although in the case of large cysts for a day or two a hollow may be felt in the position of the cysts with condensation of the tissues around. The periods are usually regular and normal, there is nothing in the immediate clinical history to indicate the cause of the development of the cyst, and usually there is nothing of note in previous history or the family history. But it has been known since the days of Réclus and Schimmelbusch that the apparently solitary cyst is an expression of a diffuse condition of both breasts, and it is not surprising, therefore, that further cysts sometimes develop, either in the same or in the opposite breast, which lend themselves to aspiration in the same way as the original cyst.

A woman may not come for medical advice until she has in one or both breasts a number of large cysts similar to the usual solitary type—*multiple cysts*. She may come with clinically diagnosable *diffuse cystic disease* of both breasts—a comparatively rare form. The whole of each breast feels shotty and not unlike the normal physiological type of shotty breast, but differing in that the shotty nodules are larger and coarser, varying in size, and in some cases large enough to allow of the insertion of a small needle and the aspiration of fluid, thus confirming the cystic nature. And finally, forming the most difficult diagnostic problem of all, there is the condition of *small aggregated cysts*. This may occur in breasts that are otherwise normal clinically or in breasts affected with clinically diagnosable diffuse cystic disease. A lump an inch (2.5 cm.) or so in diameter is felt which is hard and irregular, just like a carcinoma but without skin dimpling or other infiltrative signs. The lump is formed by the aggregation of a number of small cysts, each of which may be so tiny that nothing may be obtained on aspiration, thus suggesting that it is a solid mass. The establishment of the diagnosis of this type is usually possible only after exploration and naked eye and microscopical examination.

The Pain Syndrome

The second common clinical group of non-malignant disorders of the breast is the subjective disorder which, as stated above, I think best called the pain syndrome, affecting women from the twenties onwards. There are no objective findings. The pain may be an exaggeration of the normal premenstrual feeling of engorgement and sensitiveness of the breasts, or may be present between the periods as well. In other cases it may bear no relation to menstruation. The pain may affect both breasts diffusely, one breast, or a part of one breast. Any form of breast may be affected. In many of these cases there is the phenomenon of the pseudo-lump—i.e., the suggestion of a lump which can be felt with one method of palpation but not with another. Sometimes it is the feeling of this pseudo-lump by the patient that leads to her seeking medical advice. One other and common feature of cases of this type is the fear of cancer, experienced before and sometimes after complaint of pain. This fear may have to be elicited by direct questioning.

Both cystic disease and the pain syndrome are the commonest non-malignant conditions of the breast, the pain syndrome being slightly commoner than cystic disease, and the two together about equal in frequency to malignant disease.

Historical Review

In most reviews of the literature priority is given to Astley Cooper (1829) for the first important description of cystic disease of the breast. Credit for the first coherent account of cystic disease is usually given to Brodie (1846), but my own impression of Brodie's writing is that he did not clearly distinguish between cystic disease and what we now know as Brodie's tumour (cystic or giant fibro-adenoma). A few years later Birkett (1850) and Velpeau (1856) published monographs on diseases of the breast in which both cystic disease and the pain syndrome are clearly recognized and their main clinical features described. James Paget (1870) was interested mainly in the morbid anatomy of the cysts, which he regarded as obstructive in origin and due to periductal fibrosis, comparing cystic breasts to granular kidneys. This almost certainly wrong view of the origin of cystic disease for long persisted in the literature in spite of the work of Réclus and Schimmelbusch, which showed that cysts were secondary to epithelial changes in the ducts of the breast, and has finally disappeared only with the experimental production of cystic disease by hormones. Bryant (1887) also separated the pain syndrome and cystic disease as distinct entities.

By the latter half of the last century surgeon pathologists had recognized and defined the clinical features of both cystic disease of the breast and the pain syndrome. But the position soon became more complicated with the development of the morbid histological era in the study of breast pathology, especially by Réclus and Schimmelbusch. Réclus wrote a number of papers between 1883 and 1893 on what he called cystic disease of the breast. His main contribution was to call attention to its diffuse and usually bilateral character, and to give a clear picture of its morbid anatomy and histology. To begin with, Réclus regarded the condition as precarcinomatous, and treatment by mastectomy or even bilateral mastectomy as obligatory, but as the result of clinical experience he ended by coming to the opposite view. Schimmelbusch (1892) clearly established the histological features of the disease. He showed that the formation of the cysts was determined by the proliferation of the glandular tissue of the mamma, and as a result suggested the term of "cyst adenoma." And he concluded that if there was any risk of carcinoma

developing it was too small to justify such a drastic procedure as bilateral mastectomy, which was the rational one if prophylactic surgery were to be adopted. König (1893) appears to have been the first to emphasize the commonness of the disease.

By drawing attention to the epithelial changes in cystic disease Réclus and Schimmelbusch unwittingly supported the view which already existed, that the disease was precarcinomatous and dangerous; as a result the advocacy and practice of mastectomy increased. Most authors, however, did not carry their logic so far as to advocate bilateral mastectomy. From their time, too, the practice of grouping together cystic disease and the pain syndrome as different phases of the same condition became more general. The classic monograph of Cheatle and Cutler (1931), with its detailed study of the histological changes of cystic disease, was careful to point out once again that the pain syndrome which they called mazoplasia was a separate condition and not precarcinomatous. (Cheatle and Cutler's work was also noteworthy for pointing out authoritatively that nodularity of the breasts is not necessarily pathological; it occurs regularly under physiological conditions such as menstruation and may result from change in the supporting fat of the breast.) Among the latest writers who under the influence of histological appearances regard cystic disease of the breast as precarcinomatous is Willis (1948). But the clinical evidence to the contrary has always been very strong. I previously reviewed this question in 1939, and would refer readers to this review and to Geschickter's (1943) monograph for further references. But to take the most important observations, Bloodgood (1931), who throughout the early part of the century wrote many papers on the subject, reported a follow-up for periods of up to 30 years of more than 100 patients from whom blue-domed cysts had been removed, and found none had developed cancer. Campbell (1934) refers to 233 cases of "chronic mastitis" treated by local excision of areas of breast tissue and followed up for from 2 to 14 years. In one patient only did carcinoma of the breast develop. Geschickter found no cases of carcinoma in 231 cases of the pain syndrome followed up for many years, and only four cases of carcinoma in 378 cases of cystic disease. It is not surprising, therefore, that for many years now clinicians have tended to conservatism in the treatment of both cystic disease and the pain syndrome, and that mastectomy is rarely performed for these conditions, and still more rarely the only logical prophylactic procedure—bilateral mastectomy.

From 1930 onwards many investigators have shown that a cystic disease may be produced in the breasts of animals, chiefly mice and rats, by large doses of oestrogenic substances and that under certain conditions carcinoma of the breast may supervene (see review; Patey, 1939). Geschickter (1943) has more recently summarized his own extensive personal experimental work as well as reviewing the literature. But the application of this experimental work to human cystic disease is not clear in the field of aetiology or of treatment. Thus Bucher and Geschickter (1941) say, "It is not possible to state with assurance the endocrine disturbance in cystic disease,"—i.e., human cystic disease. And Taylor (1942) notes, "In spite of much discussion of chronic mastitis as an endocrine disease, no one has yet succeeded in proving that this breast condition represents a specific response to any recognized type of glandular dysfunction." And it is a matter of common observation that neither in cystic disease nor in the pain syndrome is there any undue frequency of menstrual disturbance. While Spence (1940) thought that testosterone injections and inunctions helped the symptoms of the pain syndrome, he had improvement in some cases from the inunction of bland ointments; and Atkins (1940) and Taylor (1942) are among those who have found hormonal treatment of this group of disorders of little practical value.

Discussion

Three important questions arise: Are the conditions both manifestations of the same disorder, or are they two separate disorders? What is their cause, or causes? What relation, if any, have they to carcinoma?

As to the first question, there is such a striking clinical difference between the patient with a cyst and the patient with the pain syndrome whose breasts show no clear objective features to distinguish them from any normal woman's that the clinician can only answer that they are separate conditions.

Under the second question, therefore, we have to consider two questions—What is the cause of cystic disease? and, What is the cause of the pain syndrome? The fact that cystic disease predominantly affects women of between 40 and 50 suggested to clinicians long ago that it was related to the hormonal changes occurring at that time, and Deaver and McFarland had suggested that they should be termed "involution cysts." But hormonal disorder is still a hypothesis although supported to some extent by experimental work. The pain syndrome, being a subjective disorder, is most likely to have a subjective cause, and here at once the most striking feature is fear of cancer. In many cases the fear of cancer is clearly the origin of the whole trouble. In other cases, but less frequently, the fixation on the breast is determined by an injury or some previous disease of the breast. But in a small proportion of cases the origin may be psychosexual. Quite accidentally in one of my cases a patient raised the question whether it might be due to a sexual maladjustment with her husband. And since then I have come across a number of similar cases—e.g., the young married woman who wants children while her husband does not; the woman married to a husband much less passionate than herself; and cases with difficulties in the sexual act. I have never regarded it as within the province of the surgeon to make routine inquiries into the sexual life of patients who come with breast troubles. And in those cases of the pain syndrome which I cannot explain on the usual fear-of-cancer basis I tell the patient that some cases of pain in the breast are due to sexual maladjustment or anxieties. Some patients will then wish to discuss further possible factors on these lines; others will not. In any case the bringing of this explanation into the open will often have a beneficial effect. Any deeper exploration of the psychosexual upset is the concern of the psychiatrist rather than the surgeon. At the present time it is not possible to say whether psychosexual factors act on the breast through nervous or through hormonal influences. It is possible that both factors are involved.

Finally, we must attempt to answer the question, What is the relation, if any, of these disorders of the breast to cancer? The pain syndrome, being a functional condition without organic basis, must clearly be quite unrelated to carcinoma. The views of various authorities on cystic disease have already been given. But the strongest support for the now predominantly held clinical view that cystic disease is not a dangerous condition likely to develop into carcinoma is the experience of many surgeons all over the world who for years have treated the condition by some simple procedure such as tapping, with its demonstration that these conservatively treated breasts do not show any special liability to develop carcinoma.

Summary

Chronic mastitis is a term which has lost all precision and value and should be abolished. There are two common non-malignant conditions of the breast met with clinically—cystic disease and the pain syndrome—which are separate and distinct conditions. Cystic disease presents clear objective physical signs from which a clinical diagnosis can be made, the cause is unknown but is possibly a hormonal upset, there is no special liability to carcinoma of the breasts affected, and tapping is a satisfactory treatment. The pain syndrome is a purely subjective disorder, although sometimes superimposed on exaggerated physiological premenstrual engorgement of the breasts, and the breasts affected present no objective abnormality. The cause of the fixation on the breast is usually fear of carcinoma, but in a small proportion of cases is a psychosexual upset. Treatment by explanation and reassurance usually results in cure of the pain.

REFERENCES

Atkins, H. J. B. (1940). *Lancet*, **2**, 411.
Birkett, J. (1850). *The Diseases of the Breast*. London.
Bloodgood, J. C. (1931). *Ann. Surg.*, **93**, 235.
Brodie, B. C. (1846). *Lectures in Pathology and Surgery*. London.
Bryant, T. (1887). *The Diseases of the Breast*. London.
Bucher, N. L. R., and Geschickter, C. F. (1941). *J. clin. Endocrinol.*, **1**, 58.
Campbell, O. J. (1934). *Arch. Surg.*, **28**, 1001.
Cheatle, G. L., and Cutler, M. (1931). *Tumours of the Breast*. London.
Cooper, Astley (1928). *Illustrations of the Diseases of the Breast*. London.
Deaver, J. B., and McFarland, J. (1918). *The Breast, its Anomalies, its Diseases, and their Treatment*. Philadelphia.
Geschickter, C. F. (1943). *Disease of the Breast*. Philadelphia.
König (1893). *Cbl. Chir.*, **20**, 49.
Paget, J. (1870). *Lectures on Surgical Pathology*. London.
Patey, D. H. (1939). *Surg. Gynec. Obstet.*, **68** (Int. Abstr. Surg.), 575.
Réclus, P. (1893). *Sem. méd.*, **13**, 353.
Schimmelbusch, C. (1892). *Arch. klin. Chir.*, **44**, 117.
Spence, A. W. (1940). *Lancet*, **2**, 387.
Taylor, H. C. (1942). *Surg. Gynec. Obstet.*, **74**, 326.
Velpeau, A. (1856). *A Treatise on the Diseases of the Breast and Mammary Region*. London.
Willis, R. A. (1948). *The Pathology of Tumours*. London.

AMETHOCAINE HYDROCHLORIDE

SEVERE TOXIC EFFECTS WHEN USED FOR BRONCHOSCOPY

BY

C. A. JACKSON, F.R.C.S.

Chief Assistant, St. Bartholomew's Hospital Chest Unit, Hill End Hospital and Clinic, St. Albans

Amethocaine hydrochloride is increasing in popularity in this country as a surface analgesic. The occurrence of two severe toxic reactions arising from its use in a thoracic unit while securing analgesia for bronchoscopy has emphasized again the danger of overdosage when applied to a mucous surface, together with a specific sensitivity shown by certain individuals. These near tragedies have prompted me to review similar cases reported in the literature and to study the properties of this drug. Since amethocaine has been used for surface analgesia twelve deaths at bronchoscopy and gastroscopy have been reported by various authors and a further three deaths during preparation for urethral instrumentation.

Whether it be due to sensitivity or overdosage, the nature of the reaction reveals a striking similarity in the majority of cases and is the typical classic picture of cocaine or procaine intoxication. Within a few moments of local application the patient becomes faint and giddy, and unconsciousness follows. There may be wandering or deviation of the eyes. A trembling and twitching of the extremities occurs which rapidly develops into generalized clonic convulsions, epileptiform in nature, during which cyanosis, foaming at the mouth, and an accelerated weakened pulse are noted. This seizure may subside with recovery or may return with a greater violence, when the patient may succumb from respiratory or cardiac failure.

Cases in the Literature

There have been a number of case reports in German and American journals since 1935 giving instances of severe constitutional disturbances and even fatalities. Apart from two deaths recorded by Hancock (1939), the only British report is found in a statistical review of causes of sudden death in which two fatalities are recorded as having occurred when this analgesic was being used in bronchoscopy.

In 1939 Fasselt reported two reactions to amethocaine 2% in anaesthetizing the throat before the removal of foreign bodies by bronchoscopy. All symptoms, however, disappeared spontaneously in these cases. Phillips and his associates (1941) reported a similar reaction in a patient who was undergoing a bronchoscopic examination. In this case generalized tonic contractions occurred which were controlled by "dial," 2 ml., given intramuscularly; the strength of the solution was not mentioned. The patient recovered.

Schoen (1939) reported three fatal reactions to local analgesia using amethocaine prior to bronchoscopy. Wagener is reported by him to have quoted a case in which 6 ml. of 2.5% solution was applied to the larynx for the removal of a wart and in which general convulsions occurred, leading to death in six to eight minutes.

In a case quoted by Cazzaniga (Schoen, 1939) a total dose of less than 130 mg. of amethocaine was used, yet the patient, a 27-year-old woman with pulmonary tuberculosis, developed severe convulsions some seconds after the initial administration and death occurred thirty minutes later.

Freeman (1939) reported four serious accidents with amethocaine employed as a mucous membrane analgesic for gastroscopy. Hancock (1939) had two deaths from the drug, also used for gastroscopy. His patients were both in advanced cachexia from malignant disease of the stomach.

Pfeiffer (1937) and Shumacher (1941) reported sensitivity to 0.5 and 1% solutions when administered in the eye. Videbeck (1936) mentioned three cases of amethocaine eczema in doctors who used the drug in their practices.

Thomas and Fenton (1943) provide a series of cases of their own in which amethocaine was shown to possess definite toxic properties. The first patient gave a history of asthma but no history of drug sensitivity. During bronchoscopy, while receiving a second spray of amethocaine 2% five minutes after the first, he had a sudden severe asthmatic attack and died thirty minutes later. A woman giving a history of pulmonary tuberculosis of one year's duration and with no known allergy, after receiving 5 ml. of amethocaine solution by pharyngeal spray became faint and suffered a generalized convulsive seizure with frothing at the mouth, which persisted until respirations ceased. Two other patients, both women, underwent bronchoscopy with amethocaine local analgesia for investigation of bronchiectasis. Feeble respirations, cyanosis, weak pulse, and clonic convulsions developed in both patients. Only after the administration of adrenaline and oxygen did these patients return to consciousness. In both cases skin tests for amethocaine sensitivity proved positive when performed afterwards. A 58-year-old man, after a gastric resection for carcinoma, was being prepared for gastroscopy with a 2% amethocaine gargle, to be followed by a 5-ml. spray, this to be repeated

2817

in ten minutes. About fifteen minutes later the patient became stuporous, suffering clonic convulsions involving the arms and legs, lacrimated, and there was drooling of saliva and grinding of the teeth. The skin was cold and clammy, the lips were cyanotic. This reaction lasted ten minutes, but the patient recovered. One patient, ten minutes after receiving 5 ml. of 2% amethocaine prior to gastroscopy, became pulseless and convulsive, developed jerky respirations, and died. Three other cases were marked by nystagmus and convulsive seizures, but all three patients survived.

Doane and Cohn (1945) reported the case of a 48-year-old woman who suffered severely from asthma. Sixteen days before admission under their care a successful bronchoscopy had been performed, using 2% amethocaine as a spray. Five days after admission she was being prepared for a bronchogram; 2 ml. of a 2% solution were instilled by a nasal catheter, no premedication being given. A further 1 ml. of the solution was being instilled eight minutes later, when the patient slumped forward unconscious and in another three minutes slight convulsive movements occurred. This seizure was relieved by 2 g. of sodium phenobarbitone intravenously, but soon returned with greater violence. A double dose of barbiturate and cardiac restorative measures failed and the patient died thirty minutes later.

Richards (1947) recorded two cases of sudden death following the application of a 2% amethocaine spray for the purpose of bronchoscopy—one in a patient with a lung tumour and the other in a case of bronchiectasis. In both cases generalized convulsions set in within a few minutes and death occurred very shortly afterwards.

Shindler (1940) and Holt (1945) each report a fatality.

Properties of the Drug

Amethocaine, known variously as "pantocaine," "pontocaine," "anethaine," "dikaine," "tetracaine," and "decicain," belongs like procaine to the para-aminobenzoyl group of anaesthetics and was introduced as decicain about eighteen years ago by Bayers.

Advantages.—It is resistant to boiling, it is stable in solution, it is lethal to all non-sporing organisms, it is ten times more potent than procaine or cocaine, and it is relatively quick in achieving its action and provides prolonged analgesia. Although the onset of analgesia is slower than with cocaine, the effect is more persistent.

Disadvantages.—It penetrates the tissues more rapidly than procaine and does not produce the vasoconstrictive action of cocaine. It is therefore essential to use it in conjunction with adrenaline, which reduces its toxicity by one-fifth. The relative toxicity of amethocaine, cocaine, and procaine is 4.5, 3, and 1 respectively, but this disadvantage is mitigated by the effective dose being one-tenth that of cocaine. It is detoxicated more slowly than procaine. It is less soluble than procaine 1 : 7 to 1 : 1.

For injection 0.1 and 0.05% solutions are recommended. For surface analgesia 2% solutions are advised (James, 1943). In Cazzaniga's case death occurred with a dose of 130 mg.; but James has used as much as 300 mg., although he advises that this amount should never be exceeded. The recommended therapeutic dose in man is 2 mg. per lb. of body weight. Hancock (1939) refers to a series of 2,000 cases of gastroscopy performed using 10 ml. of 2% solution without mishap.

For four months we have given anethaine, a 2% solution of amethocaine hydrochloride (4 ml. in conjunction with 1 ml. of 1 in 1,000 adrenaline), preparatory to bronchography and bronchoscopy. For the latter investigation the following was the procedure adopted.

The patient is given two "euphagin" tablets (benzocaine, 200 mg.) to suck forty minutes pre-operatively, followed ten minutes later with ½ or ¼ gr. (11 or 16 mg.) of morphine. In the anaesthetic room the fauces, posterior pharyngeal wall, and both pyriform fossae are painted with the above solution, using about 2 ml., but only a portion of this amount would actually be expended. A final injection of 2 ml. between the cords under direct vision usually effects adequate analgesia for the examination, although a further supply of the local analgesic is available for direct bronchial spray if required.

Case Reports

Case 1.—The patient was a 62-year-old man with superior mediastinal obstruction believed to be secondary to a right upper lobe bronchial carcinoma. Local analgesia for bronchoscopy was being induced by the above method with 5 ml. of mixed solution. Within 30 seconds of the intratracheal injection the patient, who was sitting up, complained of giddiness and then fell back unconscious; convulsions followed as described above. Endotracheal oxygen and carbon dioxide was instituted immediately. The head was lowered and venepuncture performed, 500 ml. of blood being withdrawn. Recovery took place after three convulsive seizures. There were no sequelae.

Case 2.—A young man aged 21 with left lower lobe bronchiectasis was having preparation of the pharynx and larynx by this method, but 4 ml. of the solution instead of the usual 2 ml. was injected between the cords. (The first 2 ml. was thought to have been swallowed.) Within a few moments the patient became pale and a cold sweat broke out on the face; he lay down and at once started jactitating, at first in the lips and then in the limbs. The pulse was 80–90, regular, and of good volume. He then had a convulsion, during which he became cyanosed. The clonic spasm subsided and respirations returned, but were shallow and rapid. Almost immediately convulsions were renewed with increased intensity. The patient became deeply cyanosed, and during the clonic stage it was noticed that the pulse had ceased. Intracardiac adrenaline, 2 ml., was injected, while artificial respiration was begun and oxygen was administered through a face-mask. There being no response to these measures, the abdomen was opened through an upper midline incision and direct cardiac massage through the diaphragm was performed. A flaccid immobile heart was massaged without response for about one minute. A few rhythmic contractions occurred, ceased, and then in response to further massage recurred. The heart subsequently started and continued to beat strongly with occasional extrasystoles. Although the total period of cardiac arrest was estimated at more than four minutes and unconsciousness persisted for four days, complete recovery took place.

Comment

The first patient was seriously ill with gross congestion of the head, neck, and shoulder girdle. He proved difficult to anaesthetize and was uncooperative. Five millilitres of the normal mixture (80 mg.) of amethocaine was used and must have been rapidly absorbed. The second patient was a relatively fit young man. In this case 4 ml. (64 mg.) of amethocaine mixture was projected between the cords into the trachea. In an endeavour to co-operate the patient was hyperventilating, so that the full quantity of this drug may have directly reached the alveoli and been rapidly absorbed from this highly vascular surface.

Neither patient gave a history of allergy, and, although in each case more than the usual 4 ml. of amethocaine–adrenaline mixture was used, both patients would appear to have been unusually sensitive to the drug.

No satisfactory sensitivity test has been described, but Thomas and Fenton (1943) recommended the use of a patch skin test in suspected or doubtful cases. They admit that such a test is not entirely reliable. They also suggest that

sensitivity to the drug may be provoked by its previous use or the use of procaine, which is closely related to it.

Certainly in two fatal cases (Ahroon, 1946; Doane and Cohn, 1945) there had been recent previous administration of the drug. Thomas and Fenton draw attention to the intolerance to amethocaine manifested by allergic individuals, bronchial asthmatics, etc., as well as by cachectic patients.

Following the method of Hancock (1939), the technique in preparation for bronchoscopy has been modified. Each patient is now given a 1-gr. (65-mg.) amethocaine pastille to suck thirty minutes before instrumentation. This produces a much more complete analgesia of the mouth and pharynx than benzocaine, and it is considered that any idiosyncrasy possessed by the patient would be displayed while the relatively small dose contained in the pastille was being absorbed.

Apart from the severe constitutional reactions to amethocaine on record other less serious reactions have been recognized. These include attacks of dyspnoea and asthmatic symptoms (Fujikawa, Neves, Brasher, and Buckingham, 1948), blepharoconjunctivitis (McAlpine and Berens, 1942), and occupational dermatitis and eczema in doctors and oculists (Videbeck, 1936; Cameron, 1937; Hollander, 1939; Shimkin, 1939).

Prevention of Severe Reactions.—The following prophylactic measures are suggested: (*a*) A barbiturate should be given by mouth in pre-operative preparation—e.g., phenobarbitone 3 gr. (0.2 g.) or sodium amytal or nembutal 1½ gr. (0.1 g.) 40 minutes before examination. (*b*) An amethocaine pastille, 1 gr. (65 mg.), should be given to the patient to suck 30 minutes before the examination. (*c*) Amethocaine when used for surface analgesia should have adrenaline 1 in 1,000 solution added in the proportion of 4 to 1 by volume, and the total dose of amethocaine should not exceed 4 ml. of a 2% solution (80 mg.) or a corresponding amount in a more dilute solution. (*d*) Application by means of a laryngeal spray should be avoided, since its use can easily lead to overdosage. (*e*) Amethocaine should never be applied to an inflamed, traumatized, or highly vascular epithelial surface—especially so in the urethra (Knepper, 1937). (*f*) The drug should be avoided in patients giving a history of allergy or in severely debilitated or cachectic cases.

Control of the Established Reaction.—(i) General:—Secure an unobstructed airway by endotracheal tube if necessary. Begin artificial respiration with an oxygen–carbon-dioxide mixture. (ii) To control convulsions:—The immediate intravenous administration of a rapidly acting barbiturate—20 ml. of 2½% sodium thiopentone (0.5 g.)—is usually sufficient to control convulsions. (Picrotoxin should be available in case too much barbiturate is given.) (iii) Administration of respiratory and cardiac stimulants:—nikethamide, 2–5 ml.; caffeine sodium benzoate, 7½ gr. (0.5 g.), etc.

In using amethocaine in surface analgesia, as with many other local analgesics, from time to time the unusually susceptible individual may be met with. Reactions come with devastating suddenness and the results may be disastrous. By excluding those patients mentioned under (*e*) and (*f*) above, sensitive patients should be even more rarely met with. An analysis of the fatal cases reported reveals overdosage, faulty technique, or failure to use adrenaline to be more often the cause of death than individual idiosyncrasy.

Summary

A report is given of two toxic reactions with the use of amethocaine hydrochloride as an analgesic for bronchoscopy.

A review of the literature reveals twelve reported deaths at bronchoscopy and gastroscopy, while there are many cases of severe constitutional disturbance.

The advantages and disadvantages of the drug are assessed, the difficulty of applying an adequate sensitivity test accepted, and suggestions made for the prevention and treatment of toxic reactions.

I wish to express my thanks to Mr. O. S. Tubbs for permission to report these cases and for helpful advice in the preparation of this paper.

REFERENCES

Ahroon, W. A. (1946). *Laryngoscope*, **56**, 320.
Cameron, O. J. (1937). *Nebraska med. J.*, **22**, 229.
Doane, J. C., and Cohn, E. M. (1945). *Anesthesiology*, **6**, 421.
Fasselt, H. (1939). *Arch. Ohr.- Nas.- KehlkHeilk.*, **146**, 217.
Freeman, E. B. (1939). *J. Amer. med. Ass.*, **112**, 217.
Fujikawa, F., Neves, A., Brasher, C. A., and Buckingham, W. W. (1948). *J. thorac. Surg.*, **17**, 123.
Hancock, P. E. T. (1939). *Proc. R. Soc. Med.*, **32**, 538.
Hollander, L. (1939). *Arch. Derm. Syph.*, **40**, 92.
Holt, T. (1945). *Arch. Otolaryng., Chicago*, **42**, 280.
James, N. R. (1943). *Regional Anaesthesia for Intra-abdominal Surgery*, p. 2. Churchill, London.
Knepper, R. (1937). *Münch. med. Wschr.*, **84**, 1572.
McAlpine, P. T., and Berens, C. (1942). *Amer. J. Ophthal.*, **25**, 206.
Pfeiffer, R. L. (1937). *Arch. Ophthal., Chicago*, **18**, 62.
Phillips, F. J., Congleton, V. L., and Tuttle, W. (1941). *Curr. Res. Anesth.*, **20**, 233.
Richards, R. (1947). *British Medical Journal*, **2**, 51.
Schindler, R. (1940). *Amer. J. digest. Dis.*, **7**, 293.
Schoen, F. (1939). *Wien. klin. Wschr.*, **52**, 505.
Shimkin, N. (1939). *Ann. Oculist., Paris*, **176**, 198.
Shumacher, H. B. (1941). *Surgery*, **10**, 134.
Thomas, J. W., and Fenton, M. M. (1943). *J. Allergy*, **14**, 145.
Videbeck, H. I. (1936). *Ugeskr. Laeg.*, **98**, 278.

"GAMMEXANE" AND MOSQUITO CONTROL IN THE BELGIAN CONGO*

BY

G. DAVIDSON, B.Sc.

(*From the Ross Institute of Tropical Hygiene*)

Experiments are now being carried out in a large palm-oil plantation at Yaligimba, in the Belgian Congo, on the control of malaria by adult mosquito destruction, using the residual insecticide "gammexane" in the houses in the labour camps and in several native villages around the plantation. The plantation, which occupies an area of some 30 square miles (77.7 km.²), is situated in a forest belt in the northern part of the Belgian Congo. The main species of anopheline mosquito concerned is *A. moucheti*, which breeds at the edges of the large rivers in the vicinity. There are also a few *A. gambiae* and *A. paludis*.

Mosquito densities in the houses before and after treatment with the insecticide are being determined by the following four methods:

1. The number of mosquitoes resting in the houses during the daytime is being estimated by laying white sheets over the whole floor surface of a house and spraying the closed house with a pyrethrum-in-kerosene spray.

2. The number of mosquitoes leaving the house each morning is being determined by the use of window-traps.

3. The number of mosquitoes entering during the night to bite the occupants of any one bed in the house is being determined by the use of mosquito-net traps, which mosquitoes can enter but not leave.

4. The mosquito-nets of the inhabitants of the camps and villages are being examined to determine the percentage

*This work has been made possible by grants from United Africa Company, Limited, and from Imperial Chemical Industries, Limited.

containing mosquitoes. The majority of these nets are made of calico and are usually incompletely closed by the occupant or in a bad state of repair.

Parasite rates and spleen rates have been estimated among children in many of the camps and villages before treatment, and are high throughout the area. These will again be estimated in both treated and untreated villages one year after treatment, as will the parasite rate among babies born in the villages during that year.

Salivary gland dissections are also being done on the mosquitoes before and after treatment. The sporozoite rate in the main anopheline, *A. moucheti*, is naturally low —0.4% in 3,712 dissections—and large numbers of dissections have had to be done.

Water-dispersible powders containing gammexane have been used for the spraying of the internal surfaces of the houses, and a concentration of 10 mg. of gammexane per square foot (930 cm.²) of surface has been aimed at. Eclipse "Warley" pneumatic sprayers of 2 gallons (9 litres) capacity are being employed for the spraying. These give an application rate of approximately 5 pints (2.84 litres) of spray per 1,000 square feet (93 m.²) of surface.

Results so far show after treatment a very marked reduction in the numbers of mosquitoes caught by the four methods outlined above. The best results have been obtained with the water-dispersible powder P530, containing 6% of gammexane. Mosquitoes caught by the window-trap method began to appear in significant numbers in the fifteenth and sixteenth weeks after treatment. Mosquitoes caught by the net-trap method were showing only a slight increase at this time, and almost no mosquitoes were found by the other two methods. The unreliability of estimating the persistence of the insecticide by determining mosquito densities by the flit-catching method alone has been clearly demonstrated.

Results of salivary gland dissections from treated and untreated villages are:

	Dissected	Positive	Percentage
Untreated villages:			
A. moucheti	3,712	15	0·40
A. gambiae	408	17	4·17
A. paludis	45	0	0
Treated villages:			
A. moucheti	2,001	1	0·05
A. gambiae	44	0	0
A. paludis	12	0	0

The only positive *moucheti* mosquito from a treated village was found in a net-trap three weeks after the first treatment of the village, at a time when another village only 2 kilometres away remained untreated. It is therefore possible that this mosquito flew from the untreated village and entered the net-trap without coming into contact with the treated surface of the house.

The site for these experiments was originally chosen with a view to possibly eradicating the mosquitoes in the plantation solely by adult mosquito destruction in houses. It was soon decided, however, that the plantation was not sufficiently isolated for this to be achieved, and the reappearance of mosquitoes in significant numbers after the treatment of single villages or groups of villages, isolated to the extent of 3 to 4 kilometres, has confirmed this view. However, it is proposed to try to eradicate the mosquitoes in the plantation by spraying also the villages which lie near to the plantation to form a protective barrier against invasion of mosquitoes into the treated plantation. It is thought that an initial spraying of the whole area three times during the first year can be reduced to twice a year and be quite an economical proposition.

It is hoped to publish shortly a more detailed account of this work.

Medical Memoranda

Twisted Ovarian Cysts in Children

Ovarian cyst with torsion of the pedicle is an uncommon condition in children, only about 125 cases having been reported in the past hundred years. The literature contains such interesting cases as an ovarian cyst in a 7-months premature infant and torsion of an ovarian cyst in a 10-days-old baby (Bursch). The majority of twisted ovarian cysts in children occur on the right side, and because of this the diagnosis made is usually that of acute appendicitis, or appendicular abscess if a mass is palpable. There may be symptoms of a vague character consisting of nausea and vomiting, preceded by vague abdominal ache for a few days, with one or more severe attacks of sudden abdominal pain lasting for a few hours, this being due to a tighter twist of the pedicle. The following reports illustrate typical cases.

CASE HISTORIES

(1) The patient, a girl aged 10, was first seen at 9 p.m. on Jan. 5, 1948. She had had a dull pain in the right side of her abdomen and right lumbar region on and off for three weeks, but 48 hours before admission she had had nausea and vomiting with increased pain in the right loin. Since then she had vomited white frothy matter. The pain remained in the back and right side of her abdomen and was at no time central. She had been constipated for some weeks, and 24 hours before admission had been given a soap enema, which yielded a very good result. She had had no urinary symptoms. Her activities were normal for her age, and she had been sleeping well.

On admission the temperature was 98° F. (36.7° C.), pulse 122, and respirations 24. She was a thin, pallid child; her tongue was slightly furred, with halitosis present. There was a moderate degree of rigidity in the right lower quadrant, with tenderness in the right side of the abdomen and right lumbar region, most pronounced about 1 in. (2.5 cm.) below McBurney's point. Rectal examination had been carried out, and the only thing noted was the presence of hard faecal masses. A diagnosis of acute appendicitis was made and laparotomy was carried out.

A Rutherford Morison incision was first employed and a plum-coloured mass was seen in the pelvis. Through this incision it was not possible to observe whether the mass was adherent to gut or not, and so a right subumbilical paramedian incision was carried out, when the mass proved to be a twisted right ovarian cyst, the size and shape of a kidney, with four twists in the pedicle. The pedicle was untwisted and afterwards transfixed, the cyst being then removed. The right tube was left intact. A small cyst was present in the left ovary. Both incisions were closed without drainage. Recovery was uneventful and the patient was discharged from hospital ten days after operation.

The histological report stated that there was massive haemorrhage in the cyst, in which were seen scattered capillaries, veins, and arterioles. Collections of polymorphs were present round most of the larger vessels, often with necrosis of the vessel wall. There was nothing to identify the tissue with certainty, but it was probably a connective-tissue tumour and possibly ovarian in origin. I am indebted to Dr. A. J. McCall for the histological report.

(2) On Dec. 5 a girl aged 9 years was admitted to hospital with the diagnosis of subacute intestinal obstruction. A cystic mass was felt on rectal examination. In the light of the experience gained in the case described above a diagnosis of twisted ovarian cyst was made. Laparotomy confirmed the diagnosis. A twisted ovarian cyst with four torsions of the pedicle was found on the left side. The cyst was removed as in the former case.

G. GORDON CROWE, F.R.C.S.Ed.,
Surgeon, City General Hospital, Stoke-on-Trent.

BIBLIOGRAPHY

Fowlie, J. A. (1944). *Amer. J. Surg.*, **64**, 285.

Precautions that the practitioner must take in dealing with drugs under the Dangerous Drugs Acts and Regulations are described in a memorandum "Dangerous Drugs Acts, 1920 to 1932," D.D.101, 5th edition (H.M.S.O., 3d.). Drugs covered by these Acts and regulations are listed, and the pamphlet describes how prescriptions for them must be written, dated, and signed, how the medical practitioner should obtain and store the drugs, and what records he should keep. The memorandum concludes with an appendix extracted from the Report of the Departmental Committee on Morphine and Heroin Addiction, discussing the precautions to be observed when administering these drugs in medical practice.

Reviews

SOCIAL MEDICINE

Changing Disciplines. By John A. Ryle, M.D. Lectures on the History, Method, and Motives of Social Pathology. Oxford Medical Publications. (Pp. 124; illustrated. 12s. 6d.) London: Oxford University Press (Geoffrey Cumberlege). 1948.

Because of the personal and professional stature of its author, and also because he was the first among us to assume the academic title of professor of social medicine, his views on the content, scope, instruments, and aims of this branch of medicine must necessarily command widespread attention. It is largely because of his personal qualities, the attractiveness of his advocacy, and the work that he performed while he was alone in academic social medicine that the subject has in Britain claimed such interest and that chairs of social medicine have been created and are now being filled in so many of our universities. It was fortunate, therefore, that Professor Ryle should have been persuaded to go to America and been required during the course of his visit to state his creed. As he says in his preface, in preparation for the visit he attempted to crystallize some of his ideas born of experience which had come to him since he had transferred his energies from the field of clinical and personal medicine to new ventures in the field of social medicine, from studies in individual pathology to studies in social pathology.

Professor Ryle senses that medicine is changing as social aims are changing, and he expresses the view that while medicine, through scientific and technical advances, has greatly gained in potentiality during the last quarter of a century it has become less surely attuned to some of the more fundamental human needs, to the deeper personal needs of the individual and to the broader social needs of the group or community. He charges the profession with thinking more about curing than preventing, more about medical care and its huge costs than about the economies that could be effected by attacking the basic causes of disease. His creed is stated. The whole man and his family are the practising physician's charge, but they can no longer be considered in detachment from their total environment or from the larger communities of which they are but a part. Communities large and small are now due for a more intimate study and care in respect of their health and sickness, for they cannot be considered apart from their total environment or from the individuals and families of which they are composed. State medicine must be based on scientific principles and especially on humane understanding. Good social medicine must in fact have its foundations in sound social pathology.

This book in the main is an edited collection of lectures previously given. The author discusses social pathology and the new age in medicine, the social post-mortem examination and its bearing on aetiological research, the affairs of the Institute of Social Medicine at Oxford, the meaning of normal and the measurement of health, social medicine and the population problem, medical ethics, and the new humanism, and he successfully answers the question how medicine in its immediate development may become better able to tackle the new problems that social changes have created, and how it may accept greatly enlarged responsibilities in relation to community health. It is much more than an intelligent discussion of matters of fact and of interpretation, for within its pages and behind the writing can be seen clearly the portrait of a man who in type and temperament is admirably suited for leadership in this particular field and whom the practice of humanistic medicine has moulded into an altogether attractive person.

F. A. E. CREW.

HOUSING AND POPULATION

Housing and the Family. By M. J. Elsas. (Pp. 136. 8s. 6d.) London: Meridian Books Ltd.

This book is about the housing needs of the country in relation to the change in population consequent upon the declining birth rate and the trend towards a greater proportion of old people. The author describes this relationship as "the demographic factor," and he discusses housing from the demographic point of view. There is a considerable amount of statistical information on the number and ages of existing houses, and information gained from a comprehensive questionary which was completed, at the author's request, by 18 local authorities—ten county boroughs, four boroughs, one urban district, and three rural districts. The questionary showed the number of dwellings built by the authorities concerned between 1919 and 1940, and the size, type, rent, etc., of each.

In Chapter V, "Housing Indices," it is interesting to note that there were in 1939 a greater number of dwellings per 100 persons than in 1931 (28.0 as compared with 23.5). Overcrowding was reduced, but the author points out that the improvement is not so great as might at first appear, since families are now smaller and more houses are required to accommodate the same number of people. He rightly criticizes the overcrowding standard as laid down in the Housing Act, 1936, as being too low (although the highest in Europe), but few public health officers will agree that a cubic-space instead of a floor-space standard is desirable. The cubic-space idea was rejected years ago, since it gave an altogether false value to the older house with 12-ft. ceilings, the upper 3 ft. at least performing no useful function. On such a standard a cathedral could accommodate more people than could stand in it. The present tendency to favour a ceiling of 8 ft. 6 in. has much in its favour from the public health point of view. The author's statement about overcrowding (p. 96), "Every room in the house can be used as a bedroom if it has sufficient space," may be misleading. In computing the permitted number of people for a dwelling-house, any room of a type not normally used in the locality as a living-room or bedroom is excluded. Thus sculleries and bathrooms are ignored, and in the ordinary working-class house—the "two up and two down"—the permitted number is generally five persons, for the back room downstairs is not generally used as a living-room.

The author criticizes the scarcity of rent rebate schemes and suggests a national rent rebate system to apply to all houses, whether owned by local authorities or private landlords. This is a highly controversial topic. The book is very interesting and can confidently be recommended to all concerned with housing or indeed the welfare of the people.

J. M. MACKINTOSH.

CHEMOTHERAPY IN MENINGITIS

Traitement Moderne des Méningites purulentes aiguës. By René Martin and Bernard Sureau. (Pp. 256; 40 figures, 2 plates. 450 fr.) Paris: Editions Médicales Flammarion. 1948.

The treatment and prognosis of meningitis have been changed by the discoveries of the past fourteen years more profoundly than those of any other disease. Most accounts of what chemotherapy can achieve deal either with a single type of infection or a particular form of treatment and are often based on relatively few cases. A treatise on the treatment of purulent meningitis in general, founded on the exceptional experience afforded by the Hôpital Pasteur in Paris, is therefore particularly welcome. The authors describe over 60 personal cases, many in detail; 28 of them were meningococcal, 13 pneumococcal, 6 streptococcal, 10 staphylococcal, and 4 due to *H. influenzae*. Except for the first-named infection, which usually responds well to sulphonamides alone, Martin and Sureau advocate combined antibiotic and sulphonamide treatment. Their methods are vigorous: intrathecal penicillin is given twice daily, and their dosage of sulphonamides is, if necessary, enormous, even reaching 1 g. daily per kg. body weight, and producing in the cerebrospinal fluid concentrations up to 70 mg. per 100 ml. Sulphadiazine is favoured, and another sulphonamide is often given together with it. The reader perplexed by the French designations for these drugs (sulphanilamide, for instance, being "1162F") will find a key to them

on page 132.

After accounts of the treatment of each form of meningitis, based on the literature as well as the authors' own experience, there are chapters on the agents and methods used, on relapses and their distinction from effects of the treatment itself ("medicamentous meningitis"), on recurrent meningitis in cases of congenital cerebrospinal rhinorrhoea and its surgical

prevention, and finally on laboratory aids to the direction of treatment, the necessity of which is strongly emphasized. The authors provide an extensive classified bibliography, which includes references to papers on meningitis caused by no less than 17 species other than the common ones already mentioned. This monograph contains a mass of information of great practical value, and will be read appreciatively by everyone interested in its subject.

L. P. GARROD.

PRIVATE AND STATE MEDICINE

Private Enterprise or Government in Medicine. By Louis Hopewell Bauer, A.B., M.D., F.A.C.P. (Pp. 201. 25s.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications.

The title of this book makes an instant appeal to members of a profession which in Britain has been trying to solve the problem raised since the publication of the Report of the Royal Commission on the Poor Law in 1909. Here, as in the U.S.A., it is a fact that a considerable section of the population is unable to pay for complete medical care by private fees. Here, as in all democratic countries, our profession would agree with Abraham Lincoln's dictum quoted on the jacket of Dr. Bauer's book, "In all that the people can individually do as well for themselves, the Government should not interfere." But how shall we find some method of supplying what is needed short of compulsory insurance or socialization of medicine? There is no answer to this yet. Since the end of the first world war the medical profession in the U.S.A. has been fighting attempts to increase Government control, and on the whole successfully. Of these proposals Dr. Bauer gives full details. It is evident that the fight is still on. The book makes no pretence of being impartial. My criticism is that the author makes no attempt to show that there is another side to the argument, and exception can fairly be taken to the biased and exaggerated accounts given of the effects of compulsory sickness insurance in those countries which have tried it.

In his anxiety to show that there is no need for other than voluntary effort in the States Dr. Bauer says that "the proportion of medical men to population is greater here, that no other country has obtained a better distribution of doctors in the rural areas, and that preventive medicine is more effective in the U.S.A. than in countries with compulsory insurance." Yet the book contains much evidence that the rural distribution is deplorable, and Dr. Bauer has apparently never heard of our Highlands and Islands scheme. On one page he tells us that in half the counties of the States there are no whole-time medical officers of health and in some of them there is no continuity of service and they are subject to political control. The British system of N.H.I., he says, "encourage mass therapy, and medication is controlled by the Government," and "it is often stated that the British system is far better than the system which prevailed before 1911. This is undoubtedly true, because the system then in vogue [which by the way was private enterprise] was so intolerably bad that any change was bound to be an improvement." This is only one, but a typical, example of the author's judgment of the conditions in other countries, and it is in my opinion sufficient to justify one who knows better in being cautious in accepting his conclusions.

Dr. Bauer frankly recognizes the existence in the U.S.A. of large sections of the people who are either "indigent" or "medically indigent" and that it is up to the medical profession to find a way to satisfy their needs. He strongly advocates voluntary local schemes, and shows that already many such schemes favoured by the A.M.A. are in operation. The payments are to be made by employers and workmen and for the indigent by the Government. But nothing in the book seems to me to justify the belief that this method is likely to solve the national problem. And Dr. Bauer never faces the situation which would arise in a time of prolonged unemployment, or what is to be done with improvident people who refuse to join the schemes. Far from being unsympathetic to the author's desire to avoid Government control, I believe most doctors in Britain would rejoice if our brethren in the U.S.A. could evolve a solution of the problem on voluntary lines. But this book gives little encouragement to this hope.

ALFRED COX.

BOOKS RECEIVED

[*Review is not precluded by notice here of books recently received*]

Man, the Unknown. By A. Carrel. (Pp. 312. 1s. 6d.) W. Drayton, Middlesex: Penguin Books. 1948.

The author comments on man's place in the world and suggests remedies for our excessive industrialization.

Neuroanatomy. By F. A. Mettler, A.M., M.D., Ph.D. 2nd ed. (Pp. 536. 50s.) London: Kimpton. 1948.

A textbook for medical students.

Theory and Problems of Social Psychology. By D. Krech and R. S. Crutchfield. (Pp. 639. 27s.) London: McGraw-Hill. 1948.

A textbook for teachers and students of social psychology.

Sindroma Anémico do Kala-Azar. By C. Trincão. (Pp. 68. No price.) Lisbon: Sociedade Industrial de Tipografia. 1948.

A research monograph with extensive bibliographies.

Sex Variants. By G. W. Henry, M.D., and others. (Pp. 1,128. 40s.) London: Hamish Hamilton. 1948.

The personal histories of homosexual men and women, with notes on them.

Physiology. By A. D. Le Vay, M.S., F.R.C.S. (Pp. 209. 4s. 6d.) London: English Universities Press. 1948

A short account for the layman.

Ulcer. By D. Cook, B.A., M.D. (Pp. 187. $5.) Chicago: Medical Center Foundation and Fund. 1946.

The author elaborates his thesis that gastric ulcer is due to ischaemia of the mucosa caused by pressure from structures adjacent to the stomach.

Transplantation von Mensch auf Mensch aus dem Lebenden und aus der Leiche. By E. Kubányi. (Pp. 120. 12.80 Swiss francs.) Berne: Hans Huber. 1948.

A monograph on the transplantation of endocrine and other tissues from man to man or cadaver to man.

An Elementary Atlas of Cardiography. By H. Wallace-Jones, M.D., M.Sc., F.R.C.P., and others. (Pp. 108. 12s. 6d.) Bristol: John Wright. 1948.

Illustrations of electrocardiograms and skiagraphs, with annotations.

Die Indikationen zur Röntgen- und Radium-Bestrahlung. By H. R. Glauner. (Pp. 124. M. 7.20.) Stuttgart: Georg Thieme. 1948.

A short review of the conditions for which *x*-ray or radium therapy is indicated.

L'Indirizzo Psicologico nello Studio della Personalità del Reo By P. Manunza. (Pp. 138. No price.) Cagliari: Società Editoriale Italiana. 1948.

An account of researches into the psychology of delinquents.

Cardiology. By W. Evans, M.D., D.Sc., F.R.C.P. (Pp. 310. 35s.) London: Butterworth. 1948.

A textbook for medical students.

Médecine Pratique. Edited by C. Lian. (Pp. 191. 700 francs.) Paris: L'Expansion Scientifique. 1948.

Lectures on a variety of medical topics delivered to students.

World of All of Us. Issued by the Church Missionary Society. (Pp. 58. 2s. 6d.) London: Church Missionary Society. 1948.

News from the letters of medical missionaries abroad.

A Surgeon's Guide to Local Anaesthesia. By C. E. Corlette, M.D., Ch.M., F.R.A.C.S. (Pp. 355. 35s.) Bristol: John Wright. 1948.

A practical guide intended for surgeons, not for physician-anaesthetists.

Atemregelung als Heilmittel. By L. Hofbauer. (Pp. 99. Sch. 25.) Vienna: Wilhelm Maudrich. 1948.

A short account of the treatment of chest disorders.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY JANUARY 15 1949

CONCERNING HOLES AND PEGS

That man is well who derives from what he does, and particularly from his energy expended for the common good, physical, intellectual, and emotional satisfaction. He tends to be ill if his needs in respect of such satisfaction remain unconsidered. Sickness, unhappiness, and inefficiency in the individual and in the group can be the dramatization of discontent cradled in disharmony between man and the conditions of his external social world. It is no new observation that for the maintenance of health and efficiency the tasks demanded of an individual should not in their demands exceed the limits of his total potential abilities and should not be too far below the upper limits of these. Yet in civil life it is not always easily possible to ensure that the immature shall enter that occupation which will offer him the opportunities that he must enjoy if he is to become a complete citizen and a hale individual. In the Army it is possible and greatly to be desired. In its fabric there is a multitude of holes of varying size and shape, definable and measurable. Among its recruits there is a multitude of pegs of infinite variety, differing in respect of physical, intellectual, and emotional qualities and of acquired and potential skills, some of which are amenable to accurate measurement. In this issue of the *Journal* Major R. T. Fletcher tells the story of the methods which in their sequence have been employed in the Army in attempts to pre-select the man for the job. The complementary story of the methods that have been devised to attune the man to his job belongs, unfortunately, not to the medical services but to the Directorate of Selection of Personnel. This dissociation of the purely medical assessment of the individual's physical attributes and the military assessment of his qualities in respect of employment was productive of much confusion and wasted effort.

To begin with, the civilian medical boards were responsible for the classification of a man into one of four grades of physical fitness for service. The Army medical and selection services then took up the task of specifying the form of employment that was suitable to his physical condition and of posting a particular recruit to a particular arm. The former attempted to devise a system of medical categories which would translate the civilian grades into terms of military employment. These grades differed in respect of visual acuity, ability to march long distances, general soundness of constitution, and of other manifestations of defect likely to affect the performance of military duties. As was to be expected, this system proved in experience to be exceedingly faulty. An Army unit is not composed of identical individuals performing uniform tasks. It is a diversified community in which there is a highly organized division of labour. Categorization by reference to physical attributes can be utterly misleading, since the presence of physical defect does not necessarily imply functional imperfection.

No wonder then that during the war this system was so elaborated that at the end the series of categories demanded by its various permutations and combinations of physical characteristics, including subdivisions to include men over 41 and such as were fit for non-tropical and home service only, numbered no fewer than 72. That the system was itself inherently complicated, its administrative procedures cumbersome, and the underlying principles never completely grasped was clearly indicated by the stream of amendments and revisions which poured forth unceasingly. The system never fully succeeded in attaining complete correlation between physical condition and aptitude for employment, and continuous attempts were made to devise some alternative method likely to prove more flexible in application and more promising in results. It had become evident that any one of the many categories was related not to any one prescribed form of employment but to a multiplicity of occupations widely diverse in nature and requirements. In determining a man's category the medical officer or board had to decide not on the man's fitness to perform the job in which he was then engaged but rather on his capacity to perform all the numerous jobs that a man of his category might be called upon from time to time to undertake. Ability to carry out certain duties could not be regarded as evidence of fitness for any specified category. It became clear that the category of a recruit should be based upon a combination of medical classification and training recommendation. Schemes to this end were devised and tested. None was satisfactory.

Eventually it was decided to put to the test the system which had been invented and adopted by the Canadians—the Pulheems system. This was based upon the truth that modern warfare made ever-increasing demands, both qualitative and quantitative, upon the soldier in physical ability varying in nature and degree according to the exigencies of his particular employment, in the level of intelligence required to grasp the technicalities of military operations, and in temperamental stability as a primary factor in determining conduct in battle. The growing complexities of military service and the widely diverse occupations which it comprised called for the application of more precise methods in the selection of personnel, since success in any undertaking depended upon the capacity of each man adequately to fulfil the task assigned to him. Moreover, conservation of man-power implied the employment of every soldier in his proper capacity so that a maximum of working efficiency and a minimum of wastage might be ensured. The system correlated two essentials: a detailed qualitative assessment of the individual soldier and a qualitative analysis of occupational requirements. In it the emphasis was placed on performance and not on physical shortcomings.

Towards the end of the war this system was thoroughly tested by a series of trials, and its value was demonstrated especially in relation to the lower categories. It was found that before it could be universally applied much instruction would have to be given to medical officers in order to wean them from their saprophytic preferences. Now it is to be used by all three Services and is beyond the

experimental stage. As Major Fletcher points out, its usefulness is not restricted to the armed Forces: it can claim its place in industry. As yet it is by no means perfect; in it there is still much that is based on clinical judgment rather than on exact measurement. The Directorate of Hygiene seeks the help of the academic scientist and is willing to place at his disposal the unique research facilities that it can command. In the large-scale employment of this system there will be abundant opportunity, especially for the experimental psychologist, the physiologist, and the specialist in physical medicine, in collaboration with the Army Medical Services, to add to natural knowledge and at the same time to render service of great value.

It seems probable that this development will have its effect upon the medical curriculum. If the civilian practitioner is to be called upon to make use of this Pulheems system it follows that he will have to be given information concerning it and be taught the principles upon which it is based during the period of his professional education. It will be for the departments of social medicine to weave this into their courses.

SECOND THOUGHTS ON PROGUANIL

The combined ingenuity of chemists, pharmacologists, and experimental pathologists has in the past quarter of a century given to the world a great number of interesting and valuable pharmaceuticals. Yet the mortality among such compounds has been high, and many of them are to-day largely of historic interest. That it takes time to assess correctly the value of any new drug has been emphasized again and again by medical men; yet this still seems to be insufficiently appreciated, for too often in the past enthusiastic receptions have been given to new and relatively untried drugs about which over-optimistic hopes have been raised. Careful and prolonged trials are especially necessary with new chemotherapeutic compounds, and above all with new antimalarial drugs because of the diversity not only of the species of plasmodia but also of strains. In assessing new antimalarial drugs there are three important questions to be answered: Does the drug rapidly control clinical symptoms? Does it produce radical cures? Does it act as a true causal prophylactic or as a suppressive? Action on gametocytes is probably of less importance, more especially in hyper-endemic areas such as West Africa, where a few gametocytes more or less can hardly make any great difference to the public health.

When "paludrine," now known as proguanil, first appeared in 1945 it was hoped, and at first perhaps with too much enthusiasm, that the solution to all the problems of the treatment of malaria had been found. It soon became apparent that, though acute attacks due to *Plasmodium vivax* are readily controlled by proguanil, the infection is not eradicated. Proguanil alone is thus inferior to a combination of pamaquin and quinine in the treatment of relapsing vivax infections. In addition it cannot be relied on to act as a true causal prophylactic. In the case of infections due to *P. falciparum* the evidence has been extremely confusing, but further light has been thrown on the action of proguanil on this parasite by Sir Gordon Covell and his collaborators, whose paper we publish elsewhere in this issue. There is now general agreement from various parts of Africa and Asia that proguanil acts more slowly than mepacrine, quinine, or chloroquine in controlling acute attacks of malaria due to *P. falciparum*. Walls[1] found that quinine and proguanil were more satisfactory than proguanil alone, and Covell and his colleagues show that the fall of temperature is hastened and the duration of parasitaemia shortened by combining proguanil with quinine or mepacrine. This is of considerable importance, for the persistence of serious symptoms in infections due to *P. falciparum* may mean cerebral involvement or even the development of blackwater fever.

The second question is whether proguanil acts by eradicating the parasites, thereby producing a radical cure. Chaudhuri[2] drew attention to the existence in India of strains of *P. falciparum* which give rise to infections not radically cured by proguanil in doses of 300 mg. for 10 days. One patient in fact had a second attack nine days after treatment and a third attack 11 days later, a radical cure being finally produced by chloroquine. Fairley and his colleagues,[3] working with New Guinea strains of *P. falciparum*, claimed to have produced a radical cure of 41 out of 41 naturally acquired infections and of 46 out of 47 experimentally induced sporozoite infections as a result of a 10 days' course of 100 mg. of the drug thrice daily. On the other hand Covell and his colleagues have now brought forward convincing evidence that proguanil alone does not produce a radical cure of a West African strain. In this respect it is inferior to mepacrine.

Uncertainty still existed whether proguanil was really a true causal prophylactic against *P. falciparum*. Fairley's experiments appeared to demonstrate conclusively that proguanil could act as a true causal prophylactic against a New Guinea strain of *P. falciparum*. Ciuca and his colleagues,[4] working in Rumania with a long-established laboratory strain of *P. falciparum*, also found that of five subjects inoculated twice weekly with *P. falciparum* sporozoites over a period of four weeks none showed fever or parasites when 300 mg. of proguanil was given every week during the period of inoculation and for two weeks after the final inoculation. Observations were made over periods of at least 23 days after the final inoculation, but no sub-inoculations were attempted, nor was it proved that the subjects were susceptible to the strain of *P. falciparum* employed. In the Belgian Congo van Riel[5] found that 300 mg. every week did not act as a true causal prophylactic; but, as Covell and his colleagues point out, the administration of the drug was continued only for 40 hours after the last possible exposure to infection, a period far too short to give any margin of safety. The experiments recorded by Covell and his colleagues show that proguanil can undoubtedly act as a true causal prophylactic against an African strain of *P. falciparum*. To be on the safe side, however, they recommend that for non-immunes a dose of 100 mg. should be taken daily.

While these investigations undoubtedly clarify the position with regard to certain African strains of *P. falciparum*, they urgently require further extension. Evidence accumulated during the war suggests that not all strains of

P. falciparum from Africa south of the Sahara are identical. African troops from the Belgian Congo stationed in Nigeria had a malarial incidence three to four times that of Nigerians serving in the same area. Gold Coast troops stationed on the north bank of the Gambia were more frequently and more severely attacked by malaria than Gambian troops alongside them. Studies on the effects of proguanil on other African strains of *P. falciparum* would therefore be of great interest.

There are other points on which further information is required if proguanil is to be extensively used. When, during the war years, large bodies of European troops were serving in West Africa, blackwater fever was abolished only when mepacrine was substituted for quinine, both in the suppression and treatment of malaria. If proguanil by itself cannot be relied upon to eradicate falciparum malaria in West Africa it is doubtful if it will have the power to abolish blackwater fever as does mepacrine. Secondly, there is growing evidence that proguanil produces resistant strains of plasmodia with comparative ease. It has already been shown that *P. gallinaceum* in fowls and *P. cynomolgi* in the monkey can be rendered resistant to proguanil[6-11]: evidence is shortly to be published that the same is true of *P. vivax* and *P. falciparum*. Resistance against quinine and mepacrine is extremely difficult to produce.

One of the facts in favour of proguanil appears to be its low toxicity. However, there have been complaints of loss of appetite, reduction of weight, and lack of energy from some of those who have taken proguanil for considerable periods. Hughes and his colleagues[12] have noticed similar signs in the rat. Recent studies by Burn and Vane[13] and by other workers[14 15] have shown that there is almost certainly a pathological basis for these symptoms, for doses of 900 mg. of proguanil in man reduce the acidity and volume of the gastric juice. Loss of appetite is a matter of moment to those Europeans who are stationed in such tropical areas as West Africa, for towards the end of a long tour the appetite is in any case rather poor and capricious. For Africans, whose diet is only too often deficient both quantitatively and qualitatively, it is obviously undesirable that they should take for long periods a suppressive antimalarial which may reduce still further their already inadequate intake of food.

In comparing the effects of mepacrine and proguanil in the prevention and treatment of falciparum malaria in West Africa it may be said that for prophylaxis both drugs must be taken daily. In a dose of 100 mg. daily mepacrine has very few failures: records are already available of patients who, in spite of taking 100 mg. of proguanil daily, have suffered from attacks. Mepacrine is not a true causal prophylactic, but if continued as a suppressive will bring about a radical cure. Proguanil is a true causal prophylactic for at least one strain, but does not produce a radical cure. Mepacrine does not injure gametocytes; proguanil inhibits their development in the mosquito. Mepacrine does not induce drug fastness; proguanil probably does. Mepacrine stains the skin and may cause psychoses, though the incidence is low—1.71 per 1,000 among 90,320 persons given mepacrine therapeutically or prophylactically.[16] Proguanil may cause loss of appetite associated with decreased acidity of the gastric juice. The relationship, if any, of proguanil to the onset of blackwater fever is not yet known. It is claimed that chloroquine, 0.25 g. of the base, effectively suppresses malaria if given once weekly, but it has not yet been tested against West African strains of *P. falciparum*. It is thus doubtful whether the ideal drug either for the prophylaxis or radical cure of malignant tertian malaria has yet been discovered.

The necessity for the intravenous administration of antimalarials is fortunately rare and occurs for the most part only in cerebral emergencies and where the patient is unable to swallow. The effects of proguanil acetate, soluble proguanil, when given intravenously are recorded by Chaudhuri and Chakravarti on page 91. The acetate, however, has now been replaced by the more soluble lactate for intravenous use. Further investigations on the comparative effects of proguanil lactate and quinine when given intravenously will be of considerable interest, more especially if carried out on patients with no immunity or tolerance to malaria.

1 *British Medical Journal*, 1948, **2**, 275.
2 *Indian med. Gaz.*, 1948, **83**, 225.
3 *Trans. R. Soc. trop. Med. Hyg.*, 1946, **40**, 105.
4 *Bull. World Health Organ.*, 1948, **1**, 297.
5 *Ann. Soc. belge Méd. trop.*, 1948, **28**, 85.
6 Bishop, A., and Birkett, B., *Nature*, 1947, **159**, 884.
7 Bishop A., and Birkett, B., *Parasitology*, 1948, **39**, 125.
8 Bishop, A., and McConnachie, E. W., *Nature*, 1948, **162**, 541.
9 Williamson, J., *et al.*, ibid., 1947, **159**, 885.
10 Williamson, J., and Lourie, E. M., *Ann. trop. Med. Parasit.*, 1947, **41**, 278.
11 Hawking, F., and Perry, W. L. M., *Lancet*, 1948, **2**, 850.
12 *J. Pharmacol.*, 1947, **90**, 233.
13 *Brit. J. Pharmacol.*, 1948, **3**, 346.
14 Vane, J. R., Walker, J. M., and Wynn Parry, C. B., ibid., 1948, **3**, 350.
15 Doll, R., and Schneider, R., ibid., 1948, **3**, 352.
16 Findlay, G. M., *Trop. Dis. Bull.*, 1947, **44**, 763.

THE DANGERS OF HEROIN

Most doctors will agree with Sydenham that they would not wish to practise medicine if denied the use of opium, but they seldom pause when they prescribe this drug or its derivatives to consider the social implications of the narcotics. It is to this aspect that the Permanent Central Opium Board has drawn attention in a report which was recently summarized in *The Times*.[1] The Board is particularly concerned with the increase in the medical use of heroin. It has been found in the past that a rise in the legitimate use of drugs of this order precedes an increase in addiction and in illicit supply. In 1931 an international conference noted the wide variations in the demands of various countries for heroin for medical use and commented on the disparity in professional practice. Acting on the recommendations of this conference, many countries, of which the United States was one, prohibited the importation and manufacture of this drug. In 1946, 71 countries required less than 1 kg. per million inhabitants, while one, Finland, required more than 25 kg. The Finnish Government estimates its country's requirements for 1949 as 51 kg. per million inhabitants, representing a more than sevenfold increase in consumption since 1936. The needs of Italy and Sweden have also risen.

The dangers of heroin are well known. Addiction is acquired more rapidly than with any other drug; once acquired, the disorder progresses with greater speed and is marked by a more profound and disastrous moral degeneration than in any other addiction. Cure is more difficult, and sudden withdrawal may prove fatal. In the light of these facts it is clearly the duty of the medical profession to examine again the therapeutic value of this substance

1 Jan. 6, 1949.

and to weigh it against its social danger. When first introduced in 1898 it was claimed that, although heroin lessened the cough reflex and slowed respiration, inspiration was deepened and increased in force. This alleged advantage over morphine has not been confirmed. Its effects on the alimentary tract are certainly less prominent than those of morphine, but where pain needs relief and these other actions are undesirable dihydromorphinone can be employed. The choice of effective analgesics has been widened by the introduction of pethidine and similar compounds. For the control of cough codeine or one of its derivatives, dihydrocodeinone or dihydrohydroxycodeinone, will suffice in most cases. In short, morphine or some related drug can always be used as effectively as heroin. Since 1931 the profession has been deprived of heroin in some 26 countries without evident disadvantage. Pharmacological opinion has long held that its social dangers overshadow its therapeutic importance. It must be granted that there is justice in the Permanent Central Opium Board's claim of "an *a priori* case for its total abolition."

DISEASE OF THE BREAST

It remains a sad fact that even with all modern methods of investigation and with the results of various therapeutic methods recorded in thousands of cases it has not yet been possible to define clearly, either histologically or clinically, the more frequently encountered pathological conditions in the breast. To remove a breast unnecessarily is a surgical crime; to leave a breast *in situ* when it contains an undiagnosed or misdiagnosed malignant tumour is almost worse. Are there any beacons to help the practising surgeon to steer between the Scylla of commission and the Charybdis of omission?

On the one side is the obviously innocent tumour, such as the fibro-adenoma, easy to diagnose and amenable to simple treatment without producing deformity or loss of function. On the other is the clinically obvious carcinoma, which by the time it has reached this stage is probably a growth of some years' standing and may even have spread either obviously or microscopically to far distant parts. In this class the signposts to treatment are also clear—pointing to a judicious mixture, varying with each growth and each individual, of surgery and radiotherapy. Two papers recently published in the *Journal* were concerned with this aspect of the problem, the first by Sir Cecil Wakeley[1] and the second by Mr. Victor Riddell.[2] Unfortunately the results of treatment, especially when the relative accessibility of the breast as an organ is taken into consideration, are woefully depressing to the clinician who follows up his cases sufficiently long. He is a fortunate man who can say that one-third of his patients are alive and well five years after treatment, and even in this group lie traps for the unwary. Fat necrosis[3] is an example, for an adequate history is frequently lacking; another is the condition of plasma-cell mastitis, described by Dr. Max Cutler elsewhere in this issue.

Between the two extremes and far outnumbering them come that mass of cases and conditions labelled by one of a dozen or more names—the generic but now rightly repudiated term for which has previously been "chronic interstitial (cystic) mastitis." Also published in this issue is a paper by Mr. D. H. Patey, who describes two common non-malignant conditions of the breast—the "pain" syndrome and "cystic disease." The separation of the former condition into a class of its own—a subjective disorder without obvious clinical signs and due either to cancerophobia or to a psychosexual disturbance—is timely if its recognition serves only to distinguish one among the many manifestations of disorder in this vague intermediate class. Cystic disease, on the other hand, would appear to present innumerable problems. Undoubtedly there are many perfectly innocent cysts, but Patey himself speaks of a possible hormonal cause, with all the conflicting and possibly sinister implications that this suggests. Again, he describes a diffuse cystic disease in which accurate diagnosis is only "possible after exploration and naked-eye and microscopical examination." For the solitary cyst he advocates diagnosis by aspiration, a method also approved by Pybus,[4] who goes further and treats the condition by injection of quinine and urethane. But cysts, apart from the retention cyst of the lactating breast, are essentially degenerative in character, though they may vary widely in type, in contents, and in pathological significance. Dawson[5] divides all proliferative conditions of the breast into adenosis and epitheliosis. The former term (also approved clinically by Atkins[6]) comprises glandular growth which produces more and larger lobules and is essentially a response to physiological stimuli. Epitheliosis, on the other hand, implies proliferation inside existing ducts, and degeneration of these cells leads to cyst formation, with perhaps secondary papilliferous outgrowths or uncontrolled extension into surrounding stroma. Such cells (and cysts) are according to Dawson a very probable "*Anlage*" of carcinoma. A good, if rare, example of this condition is "comedomastitis" where proliferation within the dilated ducts is still non-invasive. Comedomastitis was described recently by Tice, Dockerty, and Harrington[7] and was mentioned by Mr. J. M. Jackson in a letter appearing in last week's *Journal* (p. 71).

Such considerations as these would seem to place cystic disease in a far from well defined category and to throw considerable doubt on its universally non-malignant character. The other large group of non-malignant breast tumours—the fibro-adenoses (nodular non-cystic breasts)—have a greater claim to innocency, though it is perhaps worthy of record that they too in the process of reaching natural quiescence by fibrosis may also develop microscopic cysts. There are still many obscurities in this field of pathology, and since it is patients as well as tumours that are concerned the perhaps hackneyed aphorisms of the clinicians still merit attention: "No fibro-adenoma occurs after the age of 35"; "A lump in the breast is carcinoma until proved otherwise"; "It is better to look and see than wait and see."

PRESENT-DAY PNEUMONIA

A valuable analysis of the characters of pneumonia and its response to the different treatments used in three recent periods has been made by Israel and his colleagues.[1] Their material consisted of patients admitted to the Philadelphia General Hospital during the twelve-month periods (including the winters) of 1936–7, 1940–1, and 1945–6. After first eliminating all patients over 60, tuberculous, post-operative, and terminal cases, the numbers available in these periods were respectively 368, 540, and 420. Of these 261, 429, and 312 were diagnosed as having lobar pneumonia, and consideration was restricted to these groups. In the first period there was no chemotherapy, and the only specific treatment used was serum in five cases: the mortality was 23.3%. In the second period all but 20 patients (wrongly diagnosed) were given sulphonamides, and the mortality was only 5.4%. In 1945–6 penicillin was also available: it was used alone in 36 cases and together with sulphonamides in 113; sulphadiazine or sulphadiazine with sulphamerazine was given to another 153; and 10 patients for some reason received no specific treatment. It might have

[1] *N. Engl. J. Med.*, 1948, **238**, 205.

[1] *British Medical Journal*, 1948, **2**, 631.
[2] Ibid., 1948, **2**, 635.
[3] Dunphy, J. E., *Arch. Surg.*, 1939, **38**, 1.
[4] *Lancet*, 1947, **1**, 480.
[5] *Ann. R. Coll. Surg.*, 1948, **2**, 241.
[6] Atkins, H. J. B., *Lancet*, 1947, **1**, 253.
[7] *Surg. Gynec. Obstet.*, 1948, **87**, 525.

been expected that the additional therapeutic resources available in the most recent period would reduce mortality still further, but it did not; there was on the contrary a slight rise, to 6.5%, and a distinct increase in the mean duration of fever and the length of stay in hospital.

The apparent reason for these differences is to be found in a change in the characters of the disease, notably in its age incidence. In 1940–1 the fourth decade had the largest number of cases; in 1945–6 the fifth and sixth each contained more than any lower age group. At the same time there was a marked increase in the proportion of patients without leucocytosis. This appears at first sight to suggest that this group included a number of cases of virus pneumonia, the course of which would be relatively unaffected by chemotherapy. That this is not the explanation is evident from the careful analysis made. It would be expected that most of these supposed virus pneumonias would occur in the patients with leucocyte counts between 5,000 and 10,000, but in fact their mortality did not differ, and their decline of fever was more rapid than those with a leucocytosis. Low leucocyte counts and a retarded response to treatment were also seen in patients whose pneumonia was proved to be of bacterial aetiology by cultivating pneumococci from the blood.

Nevertheless, the authors are inclined to the view that virus infection is responsible for the change in the character of the disease in quite a different way. Their hypothesis, originally put forward by Francis, is nothing less than that a virus is concerned in producing lobar pneumonia generally, with varying degrees of superimposed bacterial infection. The facts which they have to explain can all be accounted for by a hypothetical recent change in the relative importance of the virus and bacterial factors. This is indeed a revolutionary concept and not one which will be readily accepted, especially in view of the ease and regularity with which typical lobar pneumonia can now be produced experimentally with pneumococcus culture. It is, nevertheless, an interesting possibility to bear in mind. Comparable studies of present-day pneumonia should certainly be made elsewhere in order to see whether the tendency observed by Israel and his colleagues is general.

SICKNESS TREATED IN HOSPITALS

In a leading article[1] on the subject of morbidity surveys we have already referred to the investigation carried out by the Glasgow Health and Sickness Bureau of hospital-treated sickness among the population of Stirlingshire. This well-produced report,[2] published by the Nuffield Provincial Hospitals Trust, covers the period of twelve months beginning on Oct. 1, 1946, and records the hospital attendances of all the residents in the county irrespective of whether they received treatment at hospitals inside or outside Stirlingshire. No record, however, was made of patients who were treated in nursing-homes. In-patients during the year numbered 10,560 and out-patients 18,009, out of a total population of 183,200—i.e., one person in every seven of the population had hospital care during the year. This rather startling finding must be qualified. An examination of the tables shows that over one-third of the in-patients were women who entered hospital for their confinements or babies born in hospital, and over one-third of the out-patients attended for injuries. With the omission of these groups the proportion of the population receiving treatment at hospitals was one in thirteen. The authors stress the difficulties of interpreting hospital data in relation to the general sickness in a community, since many other factors (geographical, social, environmental, custom, etc.) besides the disease determine whether or not a patient enters hospital. Apart from mothers and babies the three largest groups of in-patients were admitted for the treatment of diseases of the digestive system (1,217 patients), infectious and parasitic diseases (760 patients), and injuries (719 patients).

The data have been extensively analysed, the patients having been grouped according to disease, age, occupation, area of residence, duration of stay in hospital, condition on discharge, etc. It is always difficult to present a mass of detail in a manner that gives the maximum information without ambiguity and at the same time in a form that is generally understood. Percentage distributions are generally not informative—the fact that a specific disease forms a larger proportion of the total admission in one social class than in another does not convey any useful information unless the numbers exposed to risk by age and sex are known. There is also a risk of gaining false impressions from percentage distributions. Taking figures from a table showing the percentage in age groups of the total number of patients admitted for certain diseases, the authors discuss the "peak" incidence—for example, they find that the peak incidence for circulatory diseases in females is at ages 35–54. Actually, when allowance is made for the varying numbers exposed to risk in each age group, it is clear that the peak vanishes and the incidence increases throughout life—a finding to be expected from the known trend of mortality. The presentation of some of the tables could be improved, and some omitted since they give no useful information. The division of the percentage of hospital admissions in each age group by the percentage of population in each age group seems clumsy and is no improvement on the usual method—i.e., admissions expressed as a percentage of the population exposed to risk. There is little to be learnt from a comparison of the duration of stay in hospital for all causes combined with figures obtained from old records, since methods of treatment and hospital policy have changed considerably, and, moreover, with the discovery of many auxiliary aids to diagnosis a larger number of patients are admitted for investigation (generally only for a few days) than formerly. This investigation, by breaking new ground, provides useful guidance for future inquiries.

[1] *British Medical Journal*, 1948, **2**, 686.
[2] *Hospital and Community. 1. Hospital-treated Sickness Amongst the People of Stirlingshire.* 1948. Nuffield Provincial Hospitals Trust.

INCREASE OF MILEAGE FUND

The General Medical Services Committee sent a deputation to the Ministry of Health on Dec. 22 to put before it the problems at present facing rural practitioners and to urge the need for the relief of financial hardship suffered by so many of those practising in rural areas. As is announced in this week's *Supplement*, the Ministry of Health has proceeded to lighten the load by increasing the Mileage Fund by rather more than 50%. This Fund has been increased by £700,000—from £1,300,000 a year to £2,000,000. The increase is made up by a new provision of £500,000, and by £200,000 from the Special Inducement Fund. The new Fund of £2,000,000 will be retrospective to July 5, 1948, and in the case of some practices this will increase the annual income by several hundred pounds. This substantial increase in the Fund is a tribute to the pertinacity of those who are negotiating on behalf of the medical profession, and a welcome sign that the Ministry of Health will respond to a strong case cogently put. It is, of course, yet to be seen to what extent this will relieve the financial anxiety of rural practitioners, and whether it will provide a sufficient reward for those general practitioners who care for the health of the people who live in the four-fifths of Britain that still remain the countryside.

HAEMATEMESIS AND MELAENA*

BY

NORMAN C. TANNER, F.R.C.S.

Senior Surgeon, St. James Hospital, London

Cases of massive gastro-duodenal bleeding treated at St. James Hospital, London, in the period of 1941–8 numbered 650. Peptic ulcer and gastritis accounted for 85% of these cases, as is shown in Table I.

TABLE I.—*Final Diagnosis*

Gastric ulcer	290
Duodenal ulcer	195
Anastomotic ulcer	29
Oesophageal ulcer	2
Gastritis	40
Carcinoma of the stomach	24
Portal hypertension	22
Hiatal hernia	3
Simple tumour of the stomach	4
Gastric diverticulum	1
Aneurysm of the aorta	1
Pancreatitis	1
Uncertain, duodenal diverticulum, etc.	38
Total	650

Although oesophageal varicosities are a typical feature of portal hypertension, it is not so well known that varicosities may occur in the body of the stomach, and they were observed gastroscopically in one of these 22 cases. There is great difficulty in arresting the haemorrhage in this disease, and I recommend the use of an inflatable bag in the lower oesophagus which can, on distension, obstruct the collateral blood flow from the coronary veins and so reduce the pressure in the oesophageal veins to normal or less. (See Fig. 1.) A modified Miller Abbott tube is useful for this purpose and need not press on the bleeding area.

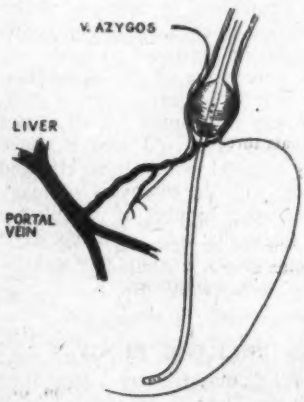


FIG. 1.—The bag inflated in the lower oesophagus, obstructing hypertensive portal flow, with aspiration or feeding tube in the stomach.

Severe bleeding from carcinoma of the stomach is not necessarily a sign of inoperability, for of 24 such cases with severe bleeding 13 were eventually treated by gastric resection and left the hospital well, though 4 required a total gastrectomy.

Gastroscopy is of value in the diagnosis of some cases of hiatus hernia; the gastroscope may first enter the supra-diaphragmatic part of the stomach and then the sub-diaphragmatic compartment. Above the diaphragm a violent heaving pulsation is seen, due to the immediate proximity of the heart, with an opening below, which varies in size with respiration, through the oesophageal hiatus in the diaphragm. If the gastroscope is passed through this opening the normal quiet appearance of the body of the stomach is seen.

Gastritis, particularly an atrophic gastritis associated with achlorhydria, may be the only positive finding in many cases of gastro-duodenal bleeding, as in 40 cases in this series. Why is the atrophic stomach prone to bleed? Occasionally a small subacute gastric ulcer is found, but in the majority of cases there is no visible ulcer by the time the patient is examined gastroscopically. In two cases minute erosions were seen directly overlying the submucosal vessels which appear so prominent in atrophic cases. I believe that in these cases minor erosions which might heal without incident in normal mucosa penetrate one or more of the submucosal vessels and cause a haemorrhage. The value of gastroscopy in this series was amply demonstrated.

*Abridged version of the first Simpson-Smith Memorial Lecture, delivered at the West London Hospital Medical School on June 10, 1948.

Peptic Ulcer and Gastritis

In England a policy of selective surgical intervention has been followed in this group, cases thought likely to fare badly under medical management being treated surgically. This policy has certain difficulties. If one waits for repeated bleeding, or waits to be certain that the bleeding is of a lethal type, then several days may have passed and the patient may be in poor condition for surgery. An alternative method is to operate on all cases of bleeding in patients who are known to have peptic ulceration, and to operate at once, as recommended by Finsterer, on all patients who have a second haemorrhage even if they have no history of peptic ulceration.

How can we discover the advantages or otherwise of surgery? Comparison of the results of different workers is practically valueless. The ages of different groups of cases recorded vary widely; in this series 38% of the patients were aged over 60, compared with the more usual proportion of 2 to 20%, and two-thirds of the deaths occurred in this group. Long lists of cases of gastro-duodenal bleeding treated surgically with few or no deaths are of little value; such figures may be readily obtained if only good risk cases are accepted. I therefore adopted a different approach. With the co-operation of the medical staff at St. James Hospital all the cases of haematemesis and melaena were admitted to my wards. A routine method of treatment was decided upon and printed on charts displayed in these wards. The intention was to remove as many variables as possible and then vary one factor only, the factor of surgical intervention, to discover its effect on mortality. It was of course impossible to exclude some variables. The introduction of the sulphonamides and penicillin had some effect, and the depletion of staff during the war also affected the results. Bombing had a bad effect on surgical mortality, and the incidence of bleeding rose during the "fly bomb" period. The total mortality figures were as follows:

Whole Series.—650 cases; 85 deaths; mortality 13.0% (number over age 60 is 249=38%).

Peptic Ulcer and Gastritis Group.—586 cases; 62 deaths; mortality 10.5% (number over age 60 is 224=38%).

During the first phase of this period, 1941–3, operation was avoided so far as possible, and the cases operated on were the persistently bleeding survivors. In the next period, for six months of 1944, early or more frequent operations were undertaken and gastrectomy was almost invariably performed. This period was terminated by the advent of the flying bombs, which made surgery inadvisable and difficult. The mortality rose during this period. Following this, operation was a little less readily undertaken, and, instead of making it a rule to perform a gastrectomy, the simplest and safest method of controlling the bleeding was used. This brought down the mortality to a lower level.

In 1948 things were sufficiently stable to try the effect of early surgery in a much higher proportion of cases, and so from Jan. 1, 1948, the dictates of Finsterer were followed. This increased the operation rate in the first four months of the year to 41%, and during that time there was no death, despite the advanced age of many of the patients. Table II clarifies these points.

TABLE II.—*Peptic Ulcer and Gastritis*

	No. of Cases	Over 60 Years	Operated on	Mortality	Average Age of Patients who Died
Period 1, 1941–3. Operation avoided if possible	193	33%	5%	10%	62
Period 2, Dec., 1943–June, 1944. Operation earlier, always gastrectomy	60	33%	15%	20%	62
Period 3, June, 1944–Dec., 1945. Simplest operation to stop bleeding, early	175	39%	11%	7%	66
1946	66	36%	8%	11%	61
1947	71	32%	15%	15%	67
Period 4, 1948. "Finsterer"	22	45%	41%	0%	—

This fourth group is too small to be significant, but will be extended. Up to Oct. 14, 1948, 60 cases had been admitted, 35 (58%) being treated by emergency operation. Of the 60 patients, two (3·3%) have died, but one of these was bleeding too severely to move to the operating theatre and the second was a bed-ridden man aged 67 who had been bleeding on and off for three months. It must be acknowledged that the series is a fortunate one.

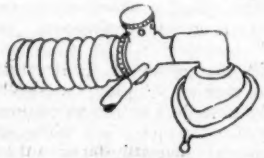
All the operations were performed under local analgesia, most of them by myself, but several by two assistants after they had spent two years in assisting at operations on considerable numbers of gastro-duodenal cases. So far as the precise surgical procedure is concerned, I considered it unwise to start the operation with a fixed determination to perform a gastrectomy, although that is undoubtedly the most certain way of stopping bleeding. In most bleeding gastric ulcers a gastrectomy is the easiest treatment. In extensive deeply penetrating ulcers in feeble persons I was often content to separate the ulcer edge from liver and pancreas and then firmly suture up the resulting opening in the stomach, taking care to include the whole crater edge in the sutures. A secondary gastrectomy has occasionally been necessary later. This procedure has undoubtedly saved some very fragile patients from death. In cases of duodenal ulcer the anterior wall of the duodenum is opened, the ulcer edges firmly approximated with deep silk sutures, and the duodenum repaired; this obstructs it, and so a gastro-jejunostomy is necessary. Although one patient bled again some days after this operation, it has given good results on the whole and has saved lives.

Finally, I believe that where there are good facilities and surgeons interested in this subject the freer use of surgery in the arrest of gastro-duodenal bleeding may give better results than those hitherto obtained. The method of deciding on a definite policy and observing the effects on the mortality of varying this policy may lead to further enlightenment.

Preparations and Appliances

ANAESTHETIC APPARATUS FOR INFANTS

Dr. D. F. REES, of Twickenham, writes: Below is described a simple method of anaesthetic administration evolved for that very awkward patient the tiny baby—i.e., from birth to the early months of life. It is based on Ayre's open T-piece method without the need for intubation. The apparatus consists of the inlet junction and mask mounting of a Waters assembly with a length of elephant tubing (6 in.—15 cm.—has proved satisfactory) fitted on to the absorber mounting. The valve is screwed shut and the feed-tube is connected to a normal Boyle machine.



In major abdominal operations—e.g., for pyloric stenosis, exomphalos, torsion of gut, and intussusception—it provides ideal conditions, with quiet respiration and adequate relaxation and oxygenation. It has the advantage over cyclopropane that an air-tight fit of the mask is unnecessary and that the administration can be performed by the relatively unskilled. Finally, the lightness of the apparatus renders the fatigue of administration minimal. In minor surgery, such as circumcisions and talipes manipulations, it is equally effective, and dispenses with the cumbrous "rag-and-bottle" method and the nuisance of preparing several Schimmelbusch masks in the event of a long list. To obviate risk of explosion when cauterizing naevi and warts a non-inflammable mixture can be administered at will.

As a guide, 2 litres of oxygen and 4 litres of nitrous oxide, with the ether tap of the standard Boyle fully open, slide up, and ether to the 6-oz. (170-ml.) mark, quickly provide adequate anaesthesia for abdominal work. The large volume of gas-flow plus the non-gastight fit of the mask ensures against CO_2 building up under the latter. A diagram is included more to emphasize the simplicity of the apparatus than to clarify the above description.

Correspondence

Infective Ear Disease

SIR,—Your leading article on infective ear disease (Dec. 18, 1948, p. 1068) reviews the problem and discusses Mr. Colin M. Johnston's paper (p. 1049) on the same subject. It states that "it seems certain that regular daily treatment is the best method of clearing up infected ears." Is this true of suppurative otitis media? Before factory managements are persuaded to set aside facilities, including valuable nursing personnel, and workers are persuaded to spend their working time in making daily visits to factory clinics, the evidence must be considered. Daily treatment must inevitably consist, as Mr. Johnston points out, in a nurse or orderly syringing the ear or cleansing the ear by dry mopping and instilling drops. I know of no method more calculated to perpetuate infection: the easiest way to set up middle-ear discharge in a case with dry perforation is to syringe the ear; does not a suppurating ear so treated become dry despite rather than because of such treatment?

Mr. Johnston's paper is an abridged version of his full report to the M.R.C., and comments are to be related to the abridged rather than the full report. Are his criteria of cure adequate, bearing in mind the fact that of 37 cases of "immediate cure" examined by him 6–18 months after cessation of treatment 46% were found to have relapsed—a result not surprising in the condition, itself liable to intermittent activity? Moreover, the average duration of treatment was 5.2 weeks, and it seems likely that the average number of treatment attendances was 25–30. Of 274 cases some two-thirds would be the simple type of otitis, tubal infection, or tympanic sepsis, for only 90 showed granulations or polypi and six cholesteatoma. Moreover, of the polyp cases a number would arise from the tympanic annulus, with excellent prognosis. That "immediate cure" resulted in 80% of cases treated to conclusion is therefore not surprising, but I submit that a result as good could have been obtained with far less treatment.

In such cases treatment *by an otologist* perhaps once, perhaps repeated at weekly intervals three or four times, will yield equal results. The essentials are very careful toilet of the meatus and application of 20% silver nitrate, which is far preferable to chromic acid or trichloracetic acid; it is an effective caustic and need not be confined to the precise area of the middle ear, being harmless in the external ear and indeed helpful if, as frequently occurs, otitis externa accompanies the otitis media. The application of silver is immediately followed by free insufflation, not light dusting but largely filling the meatus, with pulv. P.S.U. (sulphathiazole 10 parts, urea 1 part, penicillin 2,000 units per gramme). Such treatment is only with extreme rarity followed by skin reactions.

In cases of tubal infection (antero-inferior perforation, discharge of mucous type, notably influenced by occurrence of coryza) infection in the nose, sinuses, or nasopharynx requires treatment, but deviation of the nasal septum and tonsillar or dental infection are rarely significant in the otitis.

More important, though less numerically, than these "nuisance cases" of otitis media are those with cholesteatoma or osteitis extending beyond the tympanic annulus, and I hope that Mr. Johnston will be able to amplify the information he has given, to record the number of cases showing attic perforations and granulations persisting despite treatment and correlate the results of treatment with these findings. It would seem that he takes too tolerant a view: to regard cases showing persistent pus in the middle ear not extruding through the perforation as "quiescent" is to misunderstand the whole pathology of the middle ear cleft. In days past radical operations were done in cases of persistent middle-ear suppuration of the tympanic sepsis and tubal type: that is history, and best forgotten. But the otologist who takes too lightly his cases of cholesteatoma, or deep osteitis, or granulations of antral origin incurs much responsibility: indefinite supervision will be required, and sooner or later operation will be advised—or the patient will fail to continue attendance, for which the otologist must blame not the patient but his own dilatory decision. In these cases, correctly diagnosed as such (a small proportion only of the total), there is expectation only of continued discharge, progressive increase of deafness, and possible sudden complication of the most serious nature.

Operation should be advised after trial of conservative treatment, for it is only after such treatment in many cases that the precise pathology can be determined. Otoscopy and trial treatment of short duration are all important—neglect *x* rays, so often unhelpful and not infrequently misleading in otology. Operation must be performed according to the operative findings and be as limited as the disease permits. In these cases the disease is in the antrum and/or attic, and the lower tympanic and tubal region are best left undisturbed in almost all cases. The transmeatal route gives direct access to the site of disease and greatly speeds up convalescence and healing. The operation involves only 3 to 4 days in bed, 8 days in hospital, and dressings once weekly for 5 to 6 weeks. The only justification for postponement of so simple a treatment is the desire to spin out as long as possible still good hearing in the diseased ear, the other ear being more deaf: the surgeon fears that in dealing with extensive disease he will encroach on still functioning hearing mechanism. Such cases do occur and they must be watched carefully; sooner or later spread of disease, increasing the indication for operation or increasing the damage to the hearing, will bring the patient to operation.

Mr. Johnston's findings throw light on the importance of the problem of chronic otitis: we must be sure we tackle in the right way the disease in all its forms.—I am, etc.,

Canterbury. T. A. CLARKE.

SIR,—As a school medical officer, I read Mr. Colin M. Johnston's paper (Dec. 18, 1948, p. 1049) with great interest, as infective ear disease presents an important problem among the school population. In fact, in a sample of 1,241 "defects discovered at routine examinations" which I analysed recently I found that 12.0% were assigned to diseases of the ear, nose, and throat—a figure almost identical with the 12.7% quoted by Mr. Johnston as occurring in a sample of 11,956 military out-patients.

I believe that this problem should be tackled from the epidemiological standpoint, in particular by the study of the infecting organisms, and I was disappointed to find no reference to bacteriology save a passing remark as to the possible growth of penicillin-resistant organisms in otitis externa. The following examples of bacteriological studies on pus from cases of otorrhoea will illustrate this point: (1) Pure growth of *Str. haemolyticus*—slightly "sulpha"-resistant and sensitive to penicillin. (2) (*a*) *Staph. pyogenes*—"sulpha"-resistant, penicillin-sensitive; (*b*) *Bact. coli*—resistant to sulphonamides and penicillin. (3) *Staph. pyogenes*—"sulpha"-resistant, penicillin-sensitive. (4) *Staph. pyogenes*—"sulpha"-resistant, slightly resistant to penicillin.

In none of these cases could chemotherapy, local or general, have been used successfully without this bacteriological evidence. In addition, an inspection of the findings affords a clue to epidemiology. Case 1, which was of recent origin, was associated with an organism of epidemic strain which was responsible for an outbreak of tonsillitis in the area. The other three cases were of longer standing. The staphylococcus may either have been of nasal origin or have been introduced as a contaminant during amateur efforts at treatment by the mother. In Case 2 the presence of *Bact. coli* supports the latter theory.

While studying a small outbreak of otitis media during the first quarter of 1948 I was impressed with the way in which parents consistently neglected to obtain advice in the early stages when severe earache was the predominant symptom—the stage in which systemic chemotherapy has the greatest chance of overcoming the infection. The onset of otorrhoea was regarded as desirable in that pain was relieved, and even then no advice was sought for periods which extended up to 14 days. The problem is therefore one of education and early ascertainment. As regards the latter, a policy which insists on exclusion from school of all cases of otorrhoea will result in treatment being obtained fairly early.

I am of the opinion that there is a good case for co-operation between otologist, bacteriologist, and epidemiologist in this field, and that by good team work, in which incidentally each must have respect for the others' outlook, a successful attack can be launched on this obviously serious cause of ill health in all sections of the population.—I am, etc.,

Bexley, Kent. A. J. DALZELL-WARD.

Treatment of Simple Ganglion

SIR,—I am delighted to read in the letter from my old friend Mr. Eric Coldrey (Jan. 1, p. 32) that he advocates rupturing simple ganglia rather than excising them. I entirely agree with him, both that this is sound practice and that it is not sufficiently frequently taught. It should be given a trial in almost every case. The ganglion in the commonest position, that on the dorsum of the wrist, is usually ruptured fairly easily, but that on the palmar aspect overlying the radial artery at the lower end of the radius is very resistant to rupture and often rather tender. I always use my two thumbs, one placed over the other, to apply the rupturing force. It is perhaps wise for textbooks to continue as they do to recall the well-aimed but surely traditional blow from the family Bible, as students are so ready to remember the bizarre and will know that rupture of a ganglion is a recognized practice.

But I most sharply disagree with Mr. Coldrey on two points in his letter. He says, "The results of treatment are very good indeed; most cases can be dispersed, and few recur." I used to believe the same, as few patients returned after rupturing the ganglion. But some years ago when I began following up my cases I realized that in about two-thirds of them the ganglion re-formed. However, although the betting is 2 to 1 against, the simplicity of the treatment is such as to prompt me to continue to give it a trial in all cases. I also entirely disagree with Mr. Coldrey when he says that simple ganglia arise from tendon sheaths. This is most dangerous teaching, for if a dissection for removal of a ganglion is carried out only as far as the tendon sheaths recurrence is very probable. If, in a bloodless field, the tendons and their sheaths are carefully retracted the ganglion will be seen to arise from the capsule of a joint, and this part of the capsule should be excised. Even then a few ganglia may recur. The only common ganglion that does not arise from a joint capsule that I know of is the interesting tiny tender one situated in the palm over a metacarpo-phalangeal joint.

A longitudinal incision on the back of the wrist is always more unsightly than a ganglion, but it is still being used—and much too frequently.—I am, etc.,

London, W.1. JOHN HOSFORD.

SIR,—I have read Mr. Eric Coldrey's letter (Jan. 1, p. 32) with astonishment. I have re-read it to see whether my first impressions were incorrect. The more I peruse it the more I wonder whether he and I are living in the same world. Is it true that in "many cases a wrong diagnosis is made—e.g., fibroma, neuroma, osteoma, chondroma, bursa, and even sarcoma"?

Is it really true that some of the treatments ascribed to surgical textbooks such as "hitting the swelling with a hard object" are really described in recent editions? Is it really true that excision of a ganglion "is a major surgical procedure necessitating a general anaesthetic and subsequent rest, and leaving a permanent and often unsightly scar"? Is it really true that the "jelly can be seen to disperse in the tendon sheath"? Is it still believed that "a ganglion is a collection of jelly in a diverticulum of the sheath"?

For twenty years I have been fascinated by discussion about the simple ganglion, and, probably to the annoyance of my house-surgeons, who have felt that I was robbing them of their just dues, I have preferred to carry out the operation rather than entrust it to those who do not know on what they are operating. In twenty years I have found one ganglion arising from a tendon sheath. Two arose from the middle of the shaft of the first metatarsal. All the others arose from a joint. It is the failure to realize how deep is the origin of the ganglion, so that excision is incomplete, that results in recurrence. The complete excision of a ganglion leaves a small hole in the capsule of the joint from which it has arisen. To describe the operation as a major surgical procedure is to travesty the words. Most careful asepsis is required as in all operations. A local anaesthetic will suffice for all but the very nervous patients. Subsequent rest is required only for those cases where activity would delay the healing of the wound.

If Mr. Coldrey had examined textbooks he would have found an interesting swing over in the last fifty years. In the earlier textbooks a ganglion was described as arising from a tendon

sheath; later editions give approximately 50% in favour of the tendon sheath and 50% in favour of the joint. The more recent editions give a much higher percentage describing the true origin of a ganglion.

About diagnosis of ganglion I have nothing to say, except that I am surprised that any surgeon would admit mistaking a solid osteoma or chondroma for a cyst, however tense it was.—I am, etc.,

Manchester. W. SAYLE CREER.

SIR,—I agree with Mr. Eric Coldrey's view (Jan. 1, p. 32) that the present teaching on the subject of simple ganglion is inadequate, especially as to its treatment. My late chief and I had a ganglion each near the insertion of the right flexor carpi radialis. It is interesting that in both of us anxiety would cause temporary enlargement of the ganglion. For instance, in my own case this would begin with pain about three days before an examination and later subside. A sharp tap with a small mastoid hammer would hasten the gradual subsidence. In about two years the swelling disappeared for good. Many of these ganglia are said to be tuberculous.

The continuous-pressure method of reduction by one's thumb or knuckle is very efficacious, especially if the ganglion ruptures during the proceeding. The second method quoted—viz., hitting the swelling with a hard object such as a book—is clumsy, as Mr. Coldrey says, but carried out with a more accurate and decisive technique it rarely fails. A small mastoid hammer, being heavy for its size, properly used results in the instantaneous disappearance of the swelling, much to the patient's interest and amazement. One may quickly establish a local reputation as a champion ganglion-smasher. The only failures known to me have been when the sac has been thick-walled. I have never seen the method cause any spread of tuberculosis. Apparent incompleteness of cure may result from the presence of a second and much smaller ganglion hidden by the first, or by incomplete dispersal of the jelly and subsequent thickening of the sac. It is as well, therefore, not to fail at the first attempt. The method requires good positioning and the exercise of a certain amount of nerve to avoid damage to bone and yet ensure a correct knock. A small torch applied over the swelling often aids the diagnosis. Two or three days may be required for the pain to subside after such treatment.

I agree that the other methods mentioned by Mr. Coldrey are not always successful. They are seldom required if reduction or cracking has been employed. Excision may result in local disaster and often in keloid. It is also sometimes very troublesome to perform. It seems to me that the subject could be discussed with advantage both to the patient and the doctor. The natural history of an untreated ganglion has not been authoritatively given by anyone, as far as I know. A ganglion which quickly arises from hard manual work or from strain generally cures itself.—I am, etc.,

London, W.1. G. H. COLT.

Mallet Finger and Simple Ganglion

SIR,—I was very interested to see Dr. W. J. Lloyd's remarks (Jan. 1, p. 30) concerning mallet finger. I think it is important, however, to *x*-ray all mallet fingers, as the line of treatment should differ according to whether or not a small fragment of bone is avulsed from the base of the dorsum of the distal phalanx. If there is such bone involvement, then it is worth while immobilizing the finger in the position usually recommended—i.e., 90 degrees flexion at the proximal joint, with the distal joint hyperextended. One month's fixation is sufficient, by which time clinical union is obtained.

Should there be no bone involvement, then the best results are obtained by non-fixation. I usually instruct the patient to hyperextend the distal joint by pressure of the affected finger against the thumb. This can be carried out on multiple occasions throughout the day, giving an end-result of loss of not more than 10 degrees extension at the terminal joint. Very few people find this to be any disability whatever, and the majority are able to work from the beginning. Local application of ung. "iodex" and methyl sal. helps to relieve the pain at the affected site during the first few weeks. It takes several months before the final result can be assessed.

Plaster fixation does not give results as good as the above method, and quite often the patient is unable to continue at work during the immobilization. Attempts at suturing the torn extensor may lead to loss of flexion at the distal joint or to septic complications leading to disabilities which are far greater than the results obtained by the above regime.

I would also give strong support to the treatment of simple ganglia recommended by Mr. Eric Coldrey (Jan. 1, p. 32). Treatment by aspiration and injection of sclerosing fluid is in my opinion definitely contraindicated and shows a lack of appreciation of the pathology of the condition, as there is always a communication between the ganglion and either a tendon sheath or joint. Obviously injection of sclerosing fluid into either of the latter could be very dangerous.

The complete excision of ganglia may also be dangerous in inexperienced hands owing to extensive ramifications of the ganglion amongst important anatomical structures. The treatment should be as Mr. Coldrey states: (1) attempted dispersion by pressure of the thumb, or (2) insertion of a tenotome and dispersion if the first method is unsuccessful. Recurrence may occur whatever method is used; it behoves us therefore to use the simplest method possible. Recurrence following puncture by the tenotome is not an indication for surgical excision. The only indication for surgical interference is inability to disperse the swelling following puncture, and in this case it is usually found that the tumour is not a simple ganglion at all but is often a fibroma, which one may find impossible to differentiate from a very firm ganglion.—I am, etc.,

West Bromwich. J. H. KIRKHAM.

SIR,—In his letter questioning the value of conventional treatment for mallet finger Dr. W. J. Lloyd (Jan. 1, p. 30) has made a useful point. I am not ashamed to admit that my own results are depressing, and that of six cases operated on during 1948 only one regained normal extensor function. I agree entirely with Dr. Lloyd that better and far quicker rehabilitation is to be obtained by returning to work without treatment of any kind, and that treatment is indicated only when a special skill demands an attempt to restore full function in the distal segment of the finger.

Perhaps more important than the immediate subject, however, is the general issue involved. In dealing with any non-disabling condition it is often of value to ask oneself whether prolonged treatment, which inevitably makes it necessary to cure the complications caused by that treatment, is really worth while when measured against the advantages of a rapid return to activity.—I am, etc.,

London, W.1. DAVID LE VAY.

Self-administered Pneumothorax Refills

SIR,—I have just read Dr. Philip Ellman's letter on self-administered pneumothorax refills (Oct. 16, 1948, p. 723). I have never heard of a lay person administering his own refills, but I have reason to believe that this is not an uncommon procedure among medical practitioners suffering from tuberculosis. While personally I have never encountered any such practitioners, I heard of some such half-dozen while in Australia early in 1948. This tempted me to conduct my own refills. I have since done this on frequent occasions.

The procedure is amazingly simple and devoid of difficulty or discomfort. The assistance of a nurse is not required provided the apparatus incorporates a three-way tap instead of the usual clips. This tap has three positions connecting thus: (1) outlet bottle to patient, (2) patient to manometer, and (3) both outlet bottle and manometer cut off or neutral. The bottles are set up with the water-containing bottle elevated, so that when the tap is turned "outlet to patient" air will flow from the air-reservoir bottle. First the tap is in "neutral." Then I prepare the chest, and, having drawn a few ml. of local anaesthetic into a syringe with a fine needle, I raise a bleb over an intercostal space laterally and high in the axilla. The pneumothorax being left-sided, it is necessary to stand up during the procedure, the left shoulder being abducted to ninety degrees, the elbow flexed to forty-five degrees, and the palm of the hand resting on the occiput.

A gauge 22 needle is then fitted to the syringe and the intercostal space penetrated. The space is entered with the needle either perpendicular or oblique to the skin surface, depending on one's ability to conduct this manipulation with one hand. Actually an oblique penetration is simpler but requires a longer needle. When the pleural

space has been entered a few bubbles of air drawn back into the syringe ensure a patent needle. The left hand can now be freely used for any manipulations. The syringe is now disconnected, leaving the needle *in situ*, the rubber outlet tube from the air-containing bottle is connected to the needle, the tap turned to "patient–manometer" position, and a reading obtained. Using a fine needle (gauge 22) I have never had difficulty in establishing a "free swing"; no needle blockage has occurred, nor has a second attempt ever been necessary. After a free swing is established and the reading noted, the tap is turned to the "outlet bottle to patient" position. Siphonage into the air-holding bottle results and the pneumothorax refill is now in process.

This procedure is simple and painless, and takes under fifteen minutes for a 600-ml. refill from start to finish. It can be carried out unaided, using one hand only—in my case the right, as I have a left-sided pneumothorax.

I would like to mention the use of a spirometer in controlling refills. This calls for the co-operation of a radiologist in the first instance, with the simultaneous taking of radiographs and spirometer readings. These can be correlated for almost any patient with a unilateral pneumothorax in a short time. In my own case a vital capacity of 1,600–1,800 ml. indicates satisfactory radiological collapse, while a reading of about 3,300 ml. indicates almost total re-expansion, with difficulty in entering the pleural space. This of course does not displace routine films but is nevertheless a helpful guide, as spirometry is both convenient and simple compared with frequent films and screenings.—I am, etc.,

Auckland, New Zealand. LAURIE GLUCKMAN.

Syringe-transmitted Jaundice

SIR,—I feel that Dr. Donald D. Brown's letter (Dec. 25, 1948, p. 1119) must be answered, and for this reason I would like to present the following facts for his consideration.

1. Much higher rates of hepatitis than that described by me (November 27, 1948, p. 938) have been reported as occurring in V.D. clinics. These rates occurred irrespective of outbreaks of epidemic infective hepatitis and were arrested by proper sterilization and supervision of syringe technique. Very low rates of hepatitis have continued in the clinics concerned, irrespective of the incidence of jaundice in the population.

2. My cases were not divided into infective hepatitis and syringe-transmitted hepatitis. Such a division is admittedly clinically impossible. It should, however, be pointed out that no outbreak of infective hepatitis occurred in this area at or about the dates concerned (April to September, 1947). A survey of the literature reveals only one description concerning the incidence of hepatitis during an epidemic of the infective type. This was in Leicestershire, and the incidence was much less than 1% of the population.

3. For at least ten years jaundice has been by far the commonest complication of the antisyphilitic treatment given in this clinic.

4. During the period reviewed the incidence of hepatitis in male patients suffering from gonorrhoea was 4%, when these patients were followed up for four months. These patients made about 14 visits during the four months and shared the waiting-room with syphilitics under treatment and incubating hepatitis. They received one intramuscular injection of penicillin, and blood for W.R. was taken on five occasions. The W.R.s were performed with a common syringe and needle, washed in running tap water between each blood-taking and boiled once a day only.

5. No records of the incidence of hepatitis in the families of these men is available, but, as Dr. Brown will understand, a fair proportion of the females attending the clinic were wives, sweethearts, consorts, mothers, and daughters of male patients. The incidence of jaundice at the female end of the clinic for all syphilitic patients attending during the reviewed period was 2% only, when these women were followed for one year. An investigation of sterilization arrangements on the female side of the clinic revealed these to be good—the only loophole to a possible syringe transmission lying in the use of a common bismuth syringe boiled once daily.

6. No case of hepatitis occurred in the clinic staff, although many of these had "long conversations" with males incubating and suffering from hepatitis.

7. Three months after the introduction of controlled boiling and with better supervision the incidence of jaundice in this clinic has shown a rapid decline.

I trust that this information, in conjunction with the very exhaustive review of the literature provided in the leading article in the *Journal* of Dec. 18 (p. 988), will confirm Dr. Brown in a full appreciation of the facts in both theory and practice. If cases of hepatitis are to occur in any number in any type of clinic where multiple injections are being given two stages are necessary: (*a*) the introduction of a syringe-transmissible virus by a patient, and (*b*) its subsequent propagation by inadequately sterilized syringes. So Dr. Brown is too modest (I cannot believe him too lucky, as I am sure the syringe-transmissible virus of hepatitis has not missed Bristol in its general itinerary). If the incidence of hepatitis in the Bristol V.D. clinic is under 1%, Dr. Brown has only his "best laid schemes" to thank.—I am, etc.,

Newcastle-upon-Tyne. R. S. MORTON.

Nephritis in Textile Workers

SIR,—Dr. G. Herdan (Dec. 18, 1948, p. 1083) makes justifiable criticism of some of the statistics in Professor Platt's article (Nov. 15, 1947, p. 771), but it seems that Professor Platt intended to indicate broad trends, and he has stated emphatically that his figures prove nothing.

Dr. Herdan's own figures appear to be at fault. In his first table the number of *male* deaths from nephritis for ages 16–24 (females is presumably a misprint) should read 220 per year and not 462 (*vide* Registrar-General's *Decennial Supplement*, 1931, Table 4A). In his second table there seem to be errors in the lowest and highest age groups, presumably because deaths at 65 and over have been related to the wrong populations at risk. This should read as follows:

*Deaths from Nephritis per 100,000 at Risk in Each Age Group**

	16	25	35	45	55	65	70+
Textile workers ..	10	14	20	111	153	433	555
All males ...	7	9	18	49	108	219	389
Social classes III and IV	7	9	18	46	102	207	389

* Taken from the Registrar-General's *Decennial Supplement*, 1931.

It will be seen that the excess of mortality from so-called nephritis of textile workers over all males and over males in social classes III and IV occurs in all age groups, but the differences in the three youngest groups are small.

There is some danger in making assumptions from such crude data, which represent the opinion of general practitioners who often cannot verify their diagnoses either by necropsy or special investigation. For example, Dr. Herdan states: "It would thus seem—adopting Professor Platt's theory of essential hypertension as a hereditary disease for textile workers—that such workers in addition to being through their hereditary make-up prone to malignant hypertension are also at an increased risk of falling a prey to renal disease through environmental factors." These assumptions may be quoted and requoted until they become established facts in the minds of many. There has already been a tendency to accept renal disease of textile workers as a definite entity caused by social or occupational factors. This does not deny the enormous value of the Registrar-General's figures, but in many instances they should be used as pointers to further investigation and not as proving the existence of an occupational or social disease.—I am, etc.,

Manchester. RICHARD SCHILLING.

*** Dr. Schilling correctly refers to a misprint. Dr. Herdan's letter was not at fault.—ED., *B.M.J.*

Spinal Analgesia and Caesarean Section

SIR,—In my letter about classical caesarean section (Nov. 13, 1948, p. 877) I incidentally expressed preference for spinal analgesia, which has called forth opposition. Dr. C. D. Sanders (Nov. 27, p. 959) says that increased uterine contractions endanger the life of the child. This is not so. Mr. D. Stanley-Jones (Dec. 25, p. 1121) suggests that there is danger of sudden death of the mother by bleeding into the uterus due to paralysis of vasomotor control, omitting the action of the powerful uterine muscle, the tone and contraction of which are increased if anything—Dr. Sanders would agree with this. I actually advise spinal "percaine" for the very reason that haemorrhage is reduced, as in other pelvic operations, and, incidentally, shock, owing to the abolition of afferent sensory impulses from peritoneum and viscera.

I have a feeling that neither of these critics is well versed in the subject. Mr. Stanley-Jones, for example, does not seem to have followed the discussion in the *Journal* (November, 1945–April, 1946)

following the publication of an article by Dr. Louis Resnick (Nov. 24, 1945, p. 722), and a discussion at a meeting of the Section of Obstetrics and Gynaecology at the Royal Society of Medicine (reported in the *Journal* of April 5, 1947, p. 463). Dr. Resnick gave two series of cases totalling 394—137 caesarean and 257 operative vaginal deliveries—as well as a series of other gynaecological operations amounting to 1,500, all under spinal analgesia (heavy "nupercaine"), with no mortality. In your issue of Feb. 2, 1946 (p. 181), Mr. Rufus Thomas wrote to confirm Dr. Resnick's findings and to add his own experience of 2,000 cases—200 caesarean sections and others, including forceps deliveries, 15 ruptured ectopic gestations, therapeutic abortions, large ovarian cysts complicating pregnancy, etc., with not a single fatality. Criticisms by Drs. Helen Alcock (Dec. 8, 1945, p. 818) and Loftus Dale (Dec. 8, 1945, p. 819) were answered by Dr. Resnick (Jan. 26, 1946, p. 145), who said that for a long time he had been prejudiced against the use of spinal analgesia, being deterred by the "risks," largely theoretical, which were advanced, usually by armchair critics. The dangers, complications, and methods of meeting them were fully discussed, and it would only be a waste of time to attempt to recapitulate them now. Another surgeon, Mr. W. C. Spackman (April 6, 1946, p. 546), told of 3,000 gynaecological cases with only two deaths (in elderly patients with large ovarian cysts). Dr. James Ross (Dec. 8, 1945, p. 819), detailing his special technique, gave caesarean section as a main indication for spinal analgesia.

I quote these surgeons because of the large experience they can adduce in this matter. I have had experience of spinal analgesia for the last twenty years or more in a fair number and in a fairly wide variety of surgical cases with the utmost satisfaction. My practice is to use light percaine (or nupercaine) for every major operation below the umbilicus, for any age, unless there is some very definite contraindication. These contraindications become less and less as one gains experience in the judgment of dosage and confidence in one's technique, including pre-medication, position of patient on the table and afterwards in bed, etc. I may say that my chief contraindication has been where a patient has been scared by hearing of some friend's unfortunate experience with a badly given spinal analgesic and her report that "she felt everything"; or, again, where some silly member of the nursing staff has a personal prejudice and in some way, perhaps indirectly, lets the patient know about it—another example of the need for good team work.

Operating under a good spinal analgesic is very satisfactory for the surgeon, and it is very pleasant at the end of the operation to tell the patient that the job is finished and to hear his surprise and also his expression of feeling very well indeed. It seems to me very reasonable to anaesthetize as nearly as possible only that part of the body on which one has to work. If a local anaesthetic will do, so much the better; but there is no doubt that for lower abdomen and pelvic work spinal analgesia is the thing. I pointed out in a letter some years ago that every ship surgeon should be master of the technique, giving him the advantage of perfect operating conditions where no skilled anaesthetist is available.—I am, etc.,

Chigwell, Essex. N. BEATTIE.

The M'Naghten Rules

SIR,—Dr. Frederick Dillon (Dec. 18, 1948, p. 1083) may lead less experienced men astray unless it is pointed out that the presumption of law is that a man is innocent until he is proved guilty. His procedure may apply where the prisoner intends to plead guilty and to prove extenuating circumstances, or where, with a plea of guilty, such circumstances are capable of proof irrespective of the prisoner's attitude to them. Otherwise the witness on either side who goes into court assuming that the prisoner committed the crime but that there is a good explanation of why he did will soon find himself in trouble.

The prosecution undertakes to prove that the prisoner, and no other, did a deed which is criminal. It may be that they succeed in proving he did the deed and fail to establish criminality, or that they fail to prove he without reasonable doubt did a deed certainly criminal. In either event the trial ends there: the prosecution have failed to set up a case demanding answer. Only when both requirements are satisfied is any answer required; and that answer may either show the prisoner did not without reasonable doubt do the deed, or that the deed was not certainly criminal, or both. In either event acquittal follows. Any accused person has therefore a double defence: (1) the prosecution may fail to establish its case, and (2) the defence may, if the case is established, break it down.

It is, perhaps, fortunate for the prisoner that the zealous medical witness for the defence has no opportunity to say, "Of course he cut his wife's throat, but I can tell you why he did, and it is not his fault," until the prosecution has satisfied the judge and jury that there is a strong probability he did, whether it was his fault or not. Dr. Dillon starts off by assuming that there is a case to answer, which, although it is the opinion of experienced legal advisers of the police and of the Director of Public Prosecutions before the case is brought before a court, and of the court of first instance before trial by judge and jury, is not the opinion of the trial court until or unless they are themselves, by evidence actually brought before them (although earlier adduced elsewhere), satisfied that there is a case to answer.

Dr. Dillon's strictures on prison medical officers are certainly not borne out by such experience as I possess. His proposals again contravene the prisoner's rights, for, although the prosecution is bound to disclose all its evidence in the depositions in the lower court in order that the defence may know what the case is they may have to answer, it is quite open to the defence, and a frequent practice, to plead not guilty and reserve the defence for the trial court, when the investigations of the visiting psychiatrist can be kept as a surprise packet for the medical witness for the prosecution under cross-examination before the medical witness for the defence is allowed in the court at all. If this fails to break down the prosecution, the psychiatrist can then himself have a second try in his evidence for the defence.

The prison doctor is not entitled to be informed of what the defence has ready for him in cross-examination any more than any other prosecution witness is, and defence counsel frequently make use of denial to witnesses of advance information such as Dr. Dillon wants them to have. His suggested alteration of legal, not medical, practice would, by preparing a material witness for cross-examination, increase the chances of conviction; and no matter how the medical or psychiatrical rules on the subject are expressed the medical witness for the defence would be left to explain how it is not the prisoner's fault, against the prosecution witness who has said it is.

Medical jurisprudence, or forensic medicine, was not in my time a subject of much interest to most students; but it is essential for any medical man who wishes to do his duty in any court to realize that it is, as the second and better name implies, essentially forensic. If he is not prepared to learn the rules of cricket before he goes on to the field, his wisest course, and that in the best interest of his patient, is to stay on his own golf course, where he can play singles to his heart's content, and keep out of the courts, where he is expected to be one of a team.—I am, etc.,

London, S.W.6. C. T. NORRIS.

Master Minds

SIR,—I note in your issue of Jan. 1 (p. 23) reference to a report of a speech made by me at a recent meeting at Hendon. It is to be deplored that you should publish such references to myself without consulting me to see whether or not the report in question was in accordance with what was said. The only part of the report that had any reference to me at all was the reference to the fact that patients could attend a doctor's surgery at certain hours of the day; the rest of what was reported was said by other speakers and not by me.

I have always held the view that the medical profession has nobly undertaken the arduous duties of a public service, but in honesty I have been compelled to refer to the lack of organization in the general practitioner service. Believe me, I made no reference to a master mind, nor do I think that there is a master mind in the Service; for it to be successful it must be a co-operative service, each one playing his proper part.

The paper in which the report appeared is, of course, definitely opposed to my political views, but if the notes of the reporter were examined it would be found that through the whole of my speech I made no reference at all to politics,—I am, etc.,

House of Commons. FRED MESSER.

*** In its account of the meeting of the North-West Branch of the Socialist Medical Association the *Hendon Times* reported Mr. Messer's speech in forty lines of print. In view of the British journalist's well-earned reputation for accurate reporting we did not consider it necessary to consult Mr. Messer about the accuracy of a strictly objective report free from comment. —ED., *B.M.J.*

POINTS FROM LETTERS

Procaine Penicillin

Dr. DAVID WHEATLEY (Twickenham, Middlesex) writes: Dr. T. David Lambert (Dec. 25, 1948, p. 1119) has recorded some of his experiences with this preparation in general practice. This prompts me to mention an alternative method of penicillin administration which I have used for some time past in general practice. I refer to the administration of pure crystalline penicillin by subcutaneous injection as has been advocated by Hoffman (*J. Lab. clin. Med.*, **31**, 1165). I have administered penicillin by this method to over 50 cases and have not encountered any case of pain or local reaction at the site of injection, and my cases have included many children, amongst them a baby of six months. These cases included pneumonias, acute otitis media, whitlows, carbuncles, etc., and puerperal mastitis. In all, the results were considered very satisfactory by physician and patient alike and compare favourably with Dr. Lambert's results with procaine penicillin. The dosage usually employed was 200,000 units dissolved in 1 ml. of sterile water every 24 hours for four days. The debatable theoretical basis for this particular dosage scheme does not come within the scope of this communication. In conclusion I would suggest that the extreme ease and simplicity of the subcutaneous injection of crystalline penicillin make it a very convenient procedure in general practice.

Rhinitis Caused by Friedländer's Bacillus

Dr. H. FARRAG (Cairo) writes: The following case report may be of interest. A patient 49 years old was suffering for the last 20 years from chronic persistent rhinitis associated with sneezing, mild cough, and absence of the sense of smell. . . . A swab was taken from the nose and examined bacteriologically. The material proved to be a pure culture of Friedländer's bacillus (*Klebsiella pneumoniae*). An autogenous vaccine prepared in the usual way (bacterial suspension killed by heat at 60° C. for one hour and 0.5% phenol added as preservative) was prepared, but gave no result. Another method was tried: the organism was grown in ordinary broth for ten days at 37° C. to allow complete disintegration. The culture was filtered through a Seitz filter, and the filtrate was tried locally in the form of a nasal spray twice daily after diluting it with three times its volume of sterile saline. This treatment proved excellent and relieved the patient within a week of application. It was continued for one month, and the patient was apparently cured. Freshly prepared filtrate of the lysed organisms by prolonged incubation seemed to be the only effective method to maintain the antigenicity of the organism unaltered, as it was found that heating or the addition of any chemical preservative to the filtrate destroyed its effect.

Prolonged Gestation Period

Dr. S. M. WELLS (Valparaiso, Chile) writes: Your account of "The Longest Gestation Period" (Nov. 6, 1948, p. 840) recalls a case of mine details of which were published in *Guy's Hospital Gazette* (Nov. 6, 1948, p. 299). This was a woman of 36 whose last menstrual period was on May 5, 1947. On July 26 the size of the uterus corresponded to a pregnancy of between two and three months. Her confinement was expected on Feb. 9, 1948, but she was not delivered until April 3. The child was a boy weighing 4.05 kg. (nearly 9 lb.). We now know that conception usually takes place fourteen days before the next expected period, the day on which ovulation is supposed to take place. Estimating, however, the length of pregnancy as it is still usually done, from the first day of the last period, this particular pregnancy lasted 334 days, i.e., 54 days above and beyond the normal 280 days.

Plain Words on Dimensional Lesions

Dr. EDWARD S. STERN (Warwick) writes: I protest against the use of the phrase "space-occupying lesion" instead of morbid swelling. It is physically impossible for a lesion not to occupy space. I would write more on this subject but cannot, owing to the space-occupying lesions on my fingers caused by chilblains.

Whooping-cough and Measles

Dr. C. L. MALHOTRA (Jubbulpore, India) writes: Dr. Frederick Rothenburgh (Nov. 6, 1948, p. 839) has mentioned that a sudden attack of pertussiform cough with heavy fits similar to whooping-cough may be a precursor of measles. That may be so, but I have seen the reverse. Attacks of whooping-cough, in no way distinguishable, during which the child in fits of coughing hugged the nurse for support, have followed a moderately severe attack of measles. The "whooping-cough" was relieved by two or three days' use of codeine cough mixture. The measles was picked up in school when it was prevalent, and there was no whooping-cough about.

Obituary

Dr. THOMAS ROGER REES died on Nov. 21, 1948, at the age of 56. A native of Alltwen, near Swansea, and the son of a well-known Nonconformist minister, he served in the R.A.M.C. in Mesopotamia in the 1914–18 war. He received his medical training in Cardiff and at St. Bartholomew's Hospital, qualifying in 1922. After a period as house-physician at the Cardiff Royal Infirmary he went into general practice in Cardiff. There he continued in active and busy practice until his last illness, though he had known for many years that his health was undermined. Throughout his time in Cardiff Dr. Rees had participated with keen interest in B.M.A. affairs, being a member of many of the local committees, including the Local Medical War Committee; he was chairman of the Cardiff Division in 1944–5. During the recent war he became a member of the Cardiff City Council, and more recently he served on the Cardiff Hospitals Management Committee, and as vice-chairman of the Cardiff Executive Council under the Health Act. He also took a lively interest in political affairs and sport, and was a valuable member of any committee, ever ready to maintain his point of view. He had a keen insight and a sense of humour which made him a delightful companion. Dr. Rees was very loyal to his patients and continued to attend them when he was not really fit for any of the work of general practice. Many of us regret the passing of "Tom," as he was familiarly known to us, and will miss his cheery laugh and high spirits, his personality and companionship, as well as his regular attendance and help at committees. He leaves a widow, to whom we extend our sympathy.—J. W. T. T.

Dr. WILLIAM BLAYNEY, son of Alexander Blayney, of Cushendall, died at his home in Watford, Hertfordshire, on Dec. 4, 1948, at the age of 71. He was educated at St. Malachy's College, Belfast, and entered the Royal Irish Constabulary in 1899. He was county inspector for Clare at the time of the disbandment of the Royal Irish Constabulary in 1922. He served in the 1914–18 war as assistant provost marshal of the 57th Division, and was for a time musketry instructor at the R.I.C. Depot in Phoenix Park. He studied medicine at St. Thomas's Hospital, and qualified M.R.C.S., L.R.C.P. in 1927 at the age of 50. Dr. Blayney practised in Harrold, Bedfordshire, until his retirement in 1943. He was highly esteemed in the district, and his thoughtfulness and kindly nature made him many friends. Both he and his wife took a very active part in village affairs, and among other activities Dr. Blayney was chairman of the Carlton and District British Legion for a number of years. He was a delightful companion, gifted, highly intelligent, and well read. His brothers were the late Mr. Alexander Blayney, a distinguished Dublin surgeon, and Dr. N. J. Blayney, of Portlaoighaise. He married in 1917 Miss Mary Beveridge, a daughter of John Beveridge, town clerk of Dublin, who survives him with four sons and three daughters.

Dr. JAMES MURDOCH MACKAY, who died at Cheltenham on Dec. 28, 1948, had a distinguished career in the West African Medical Service. He was a student of Glasgow University, and graduated M.B., Ch.B. in 1915.

A colleague writes: The death of J. M. Mackay at a comparatively early age was a direct outcome of his service in the first world war, when he was severely gassed. He served with much distinction, being awarded the M.C. and mentioned at least twice in dispatches. It was characteristic of his courage that, though granted a pension at the time, he gave this up voluntarily and proceeded to join the West African Medical Service. Here he served respectively in Sierra Leone, in Nigeria as A.D.H.S., and on the Gold Coast, where he became director of the Health Service. On the outbreak of the second world war, in spite of indifferent health, he organized and commanded the Gold Coast Regiment Field Ambulance (R.W.A.F.F.) and went right through the Abyssinian campaign. Later, taken gravely ill while on troopship duties, he had to be invalided out, and he returned again to his civilian administrative post in the Gold Coast, which he relinquished in 1945. Not content with retirement, he then joined the Ministry of Pensions staff, and was actively employed right up to his last illness. Mackay was over six feet in height and had a fine imposing presence. He was the most loyal of colleagues as well as an able administrator. He never let anyone down. His modesty, lack of self-seeking, and his sense of justice and fair play made him what he was, one of the best medical officers it was possible to serve under. He never forgot to interest himself in his juniors and to encourage them in their work. He was no "yes man" and would fight for right, if necessary at the very highest level. He was a worthy son of his Highland ancestry, of which he was

so justly proud. Not only will he be missed by the West African Medical Service and those he served under in the recent war, and by the Ministry of Pensions, but by his old comrades of the D.C.L.I., to whom he was regimental M.O. in France. To his children and to his widow our deep sympathy must be extended.

Dr. RICHARD CECIL HUTCHINSON died on Christmas morning at his home in Worthing following a second coronary occlusion. A Lancashire man, he graduated M.B., Ch.B. with honours at Manchester University in 1910, and proceeded M.D. ten years later. In 1913 he took the D.P.H. After acting as house-physician at the Manchester Royal Infirmary and at the Brompton Hospital, he was appointed to the staff of the King Edward VII Welsh National Memorial Association, being in charge of the Carmarthen and Cardigan Area. Two years' active service in France followed with the rank of captain, R.A.M.C. He was then medical superintendent successively of the Baguley Sanatorium, Manchester, the Royal National Hospital, Ventnor, and the Tor-na-Dee Sanatorium, Banchory. In 1928 Hutchinson moved to Worthing, where he spent twenty busy and fruitful years. Quiet and kindly in demeanour, a thoughtful and thorough clinician, he was at once a success in private practice. His long experience of chest work stood him in good stead. He was quickly recognized as possessing special knowledge and skill in that branch of medicine, and his services became of increasing value alike to his patients and to his professional colleagues. It was not long before he was overworked, and he never spared himself. During the war years he gave fine service to the Royal Sussex County Hospital, working long hours in the out-patient department and then, in the winter months, driving home twelve miles in the blackout. He was subsequently elected a life governor of the hospital. Dr. Hutchinson had served the Brighton and Sussex Medico-Chirurgical Society as financial and as literary secretary and, had he lived, would soon have been its president. He joined the B.M.A. in 1913, was an active member of the West Sussex Division, and had completed three years on the executive committee. A keen sportsman and country-lover, "Hutch" was equally happy with rod or with gun. Last August, in company with the writer, he caught his last salmon from a boat and shot his last grouse from a butt. His family life was happy, and he is survived by his widow, two married daughters, and a son. Shortly before his death he had after a lengthy search found a farm in West Sussex for his son, demobilized from the R.E. There, within reach of Worthing, it had been his hope to live and to continue his work but at lessened pressure.—D. H.

Mr. T. Twistington Higgins writes: Hutchinson enjoyed natural gifts of observation, critical insight, and shrewd judgment which made him one of the most able doctors I have known. His special skill and experience in chest disease brought him a well-deserved reputation, and in any company of physicians he could claim distinction. But not for this alone will he be remembered by all who knew him. Professional prowess was not foremost in the minds of those who gathered from far and wide at Christ Church, Worthing, in the wintry sunshine to do honour to his name. For each of us in that impressive congregation a personality had passed to whom, in our several ways, we owed a debt which could be acknowledged but never repaid. For above all "Dick Hutch" was a very gallant gentleman who gave of himself to others without stint or question. Such men are rare. Their lives are an inspiration, and when they no longer march with us our sadness is tempered by thankfulness that we have been privileged to know them on the way.

Dr. A. F. Sladden writes: I was intimately associated with Hubert Phillips (Jan. 1, p. 35) for the past forty-five years. His death has taken from Port Talbot and South Wales a most notable and beloved doctor. He will be remembered by his contemporaries at Oxford and St. George's Hospital, where as a student he had a distinguished career and impressed his personality on a wide circle of friends. He could undoubtedly, had he wished, have established himself as a consultant in London but chose instead to exercise his great gifts in his native country, and who shall say that he took a wrong course? Phillips was a Pembrokeshire man well versed in the history and customs of Wales, and spoke Welsh with facility. His broad education and experience of a wider world, however, made him a cosmopolitan free from any narrow nationalism. He was by inclination a surgeon, but his work as a physician was quite outstanding, and with his gifts of sympathy and untiring devotion he manifested all the qualities desirable in a general practitioner of the very best type. As a surgeon he was attached to the Port Talbot General Hospital, where his colleagues confidently referred their surgical problems to him. In consequence a heavy toll of operating was added to his other labours, but he preferred it so in spite of the excessive burden involved. There is little doubt that his continuous work latterly injured his health, but he refused to relax. In spite of his arduous professional life he found time to engage in other interests. He was gifted artistically, and with pencil and brush produced a series of coloured cartoons with grotesquely humorous figures and faces which were the delight of his friends. His garden, and particularly his roses, were a constant joy to him, and in later years he became an enthusiastic and proficient photographer. Phillips was a good conversationalist and a man of wide intellectual interests. His scientific training had not obscured for him the spiritual and philosophical aspects of life, and he was happy in being able to realize for himself a satisfactory synthesis between science and religion. Hubert Phillips was the elder son of the late Canon Phillips, of Newport, Pembrokeshire, and he married Irene, daughter of the late Canon Llewellyn Williams of Llanwenarth, Monmouthshire. He had one son, Dr. Geoffrey Phillips, now practising at Ware, and the sympathy of all his friends goes out to his widow and son. They may well be proud of his memory.

Dr. J. B. Horgan writes: It is nearly forty years since I first met Lionel Colledge (Jan. 1, p. 34) at the hospital at Golden Square, where I was acting house-surgeon. In after years I was a welcome visitor at the clinics where he worked, and I often profited from his counsel and co-operation in difficult cases. I would like therefore to express a few words in gratitude to his memory and of condolence with his British colleagues from the other side of the Irish Sea. Colledge had a stern appearance and a reserved manner which, however, hid a gracious personality with a subtle sense of humour. He was extremely modest of his high achievement in the specialty which is so much the poorer for his passing.

Medico-Legal

ANAESTHETIC EXPLOSIONS

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

Explosions in the operating theatre are fortunately rare in the United Kingdom, largely because its damp atmosphere is unfavourable to the accumulation of static electricity which constitutes such a problem in the dry air of the United States and other countries. A fatal accident of this kind, however, took place in November, 1948, in the Southend General Hospital, when during an operation the anaesthetic apparatus was wrecked, the patient mortally injured, and the anaesthetist, Dr. Noel Vincent, momentarily stunned. Dr. Vincent said in evidence at the inquest[1] that the explosion had been reported to the British Oxygen Company; a representative had visited the hospital, and the apparatus had been taken to the works and reconstructed to simulate its condition before the accident. The report stated that a leakage in the explosive mixture was present, and the source of the ignition had not been ascertained. The leakage had been found between the breathing-bag and the bag mount. The apparatus had been modified at the hospital, the concertina type of breathing-bag being superseded by a length of corrugated rubber hose and a new breathing-bag. The coroner said that the evidence showed death to have been due to collapse of the lungs as a result of pulmonary shock consequent on the explosion. He found that there was no criminal liability and expressed his sympathy with the relatives, and with Dr. Vincent that such an accident should befall him after so many years of experience.

The newspaper report does not say whether any electrical machinery was in use at the time of the explosion; presumably if it had been the company's report would have mentioned it. A high temperature generated in a theatre by central heating may of course reduce humidity to such an extent that static current may be accumulated in apparatus if this is not earthed, and then even a small spark may conceivably ignite an inflammable mixture escaping from a defective joint.

A different type of explosion was that reported recently to the Birmingham City Coroner, Dr. W. H. Davison.[2] A man aged 63 was undergoing an operation in Queen Elizabeth's Hospital, the intention being to obliterate the cavity left after pneumonectomy. Cyclopropane anaesthesia was being used and the electric cautery needle entered the cavity, with the result

[1] *Southend Times*, Nov. 17, 1948.
[2] *Daily Telegraph*, Jan. 5, 1949.

that the anaesthetic exploded. Mr. R. H. F. Brain, surgeon at the hospital, said that the risks of this method were appreciated, but it was considered that they were outweighed by the advantages. Death was due to blast, and a verdict of misadventure was recorded.

Universities and Colleges

UNIVERSITY OF DURHAM

The following medical degrees were conferred at a Congregation held on Dec. 17, 1948:

M.B., B.S.—G. L. Anderson, Anne R. Boon, P. G. Buck, Maureen T. Cunningham, June Dickson, Irene N. Dodd, Mildred C. Gardner, Sheila L. Harrison, Elizabeth J. Hunter, Alix P. M. Hurst, Eileen Hutton, Hazel E. Jopling, R. N. C. Lockey, J. McManners, J. G. Noble, Edith M. Robertson, D. Smith, J. D. R. Smith, Joan Stephens, A. E. Wright.

UNIVERSITY OF LONDON

A Special University Lecture on "Surgical Aspects of Meningitis" will be given by Sir Hugh Cairns at Westminster Medical School, Horseferry Road, London, S.W., on Thursday, Feb. 10, at 5 p.m.

Professor B. G. Maegraith will give a Special University Lecture on "Malaria as a World Problem" at Westminster Medical School, Horseferry Road, London, S.W., on Thursday, Feb. 24, at 5 p.m.

The above lectures are addressed to students of the University and to others interested in the subject. Admission is free, without ticket.

UNIVERSITY COLLEGE

The following lectures will be delivered at the College (Gower Street, W.C.): Jan. 18 and 25 and Feb. 1 and 8, 5.15 p.m., Dr. E. Ashworth Underwood, "The Development of Modern Physiology, 1700–1900"; Jan. 24 and 31 and Feb. 7 and 14, 4.45 p.m., Mr. P. Johnson, Ph.D., "The Ultracentrifuge and Electrophoresis Apparatus in Protein Research"; Jan. 27, 1.15 p.m., Professor J. B. S. Haldane, F.R.S., "Some Modern Views on Evolution"; Jan. 28 and Feb. 4 and 11, 5.15 p.m., Mr. F. Bergel, Ph.D., "Some Aspects of Pharmacological Chemistry"; Feb. 2, 5 p.m., Mr. D. Abercrombie, "Speech and Society"; Feb. 15 and 22 and March 1, 8, and 15, 5.15 p.m., Dr. A. Schweitzer, "Reflexogenic Areas of the Vascular System"; Feb. 17, 1.15 p.m., Mr. G. Burniston Brown, Ph.D., "The New Philosophy of Science"; Feb. 28 and March 7, 4.45 p.m., Professor C. Rimington, "Haem Pigments in Nature." Admission to all lectures is free, without ticket.

Cedric Keith Simpson, M.D., has been appointed to the part-time University Readership in Forensic Medicine tenable at Guy's Hospital Medical School, from Oct. 1, 1948.

The title of Reader in Applied Pharmacology in the University has been conferred on Andrew Wilson, M.D., Ph.D., Ph.C., in respect of the post held by him at University College and University College Hospital Medical School.

The following candidates have been approved at the examination indicated:

M.S.—*Branch I (Surgery)*: D. T. A. Brown, S. I. Green, H. O. Jones, D. W Williams.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

At a meeting of the Royal Faculty of Physicians and Surgeons of Glasgow held on Dec. 6, 1948, with Dr. W. R. Snodgrass, President, in the chair, the following were admitted Fellows of Faculty *qua* Physician: J. D. Aitchison, M.B., R. D. C. Brackenridge, M.B., J. H. Haldane, L.R.C.P.&S.Ed., G. Johnston, M.B., W. P. Kennedy, Ph.D., L.R.C.P.&S.Ed., H. R. F. Macdonald, M.B., J. Rankin, M.D.

The following were admitted Fellows of Faculty *qua* Surgeon: H. A. Benjamin, M.B., J. Cohen, M.B., W. Y. Cornock, M.B., J. M. McBride, M.B., J. D. McCardel, M.B., D. M. Macdonald, L.R.C.P.&S.Ed., W. Macintyre, M.B., N. McLean, M.B., R. G. CacLeod, M.B., R. G. Main, M.B., A. J. M. Mathieson, M.B., A. B. May, M.B., K. M. Mayall, M.B., I. P. Munro, M.B., T. A. Ramsay, M.B., R. P. Schach, M.B., J. M. Scott, M.B., D. M. Sinclair, M.B., R. B. Watson, M.B., T. M. Welsh, M.B., W. F. White, M.B.

The Services

The Efficiency Decoration of the Territorial Army has been conferred upon Lieutenant-Colonel W. H. Wolstenholme, O.B.E., Major (Acting Lieutenant-Colonel) A. Cowie, D.S.O., Major (Honorary Lieutenant-Colonel) G. Tudhope, and Majors E. C. Ellis and E. M. Wright, R.A.M.C., T.A.

No. 52

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Dec. 25.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1948 (a)	(b)	(c)	(d)	(e)	1947 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	22	—	13	—	1	26	4	16	1	—
Deaths		1	1				1	1		
Diphtheria	100	6	32	7	11	157	18	65	8	5
Deaths	3	—	—	—	1	6	—	—	—	—
Dysentery	30	5	28	—	3	53	6	27	—	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	—	—	1	—	—	—	—	—	—	—
Deaths		—					1			
Erysipelas			54	6	1			33	6	1
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				28					13	
Deaths	28	2	8	—	2	52	5	6	1	1
Measles*	8,959	110	86	29	50	2,583	115	278	93	7
Deaths†			1	—	1	2	—	2	1	—
Ophthalmia neonatorum	18	1	3	—	—	30	2	13	—	1
Deaths										
Paratyphoid fever	3	—	—	—	—	22	1	1(A)	—	—
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal	792	35	2	9	1	690	38	13	3	14
Deaths (from influenza)‡	25	2	2	—	—	20	4	—	—	—
Pneumonia, primary			337	23				372	11	
Deaths	258	51		7	10		37		8	4
Polio-encephalitis, acute	2	—				4	—			
Deaths							—			
Poliomyelitis, acute	17	2	1	1	—	44	2	3	1	2
Deaths§	2	—					—			
Puerperal fever		3	—		—		—	7		—
Deaths										
Puerperal pyrexia‖	78	7	5	1	1	68	6	10	—	—
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,154	42	246	120	40	1,469	104	297	18	21
Deaths†			—	—	—	3	—	—	—	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	4	1	1	2	1	2	—	2	1	1
Deaths	—	—	—	—	—	—	—	1	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	1,791	100	130	66	8	1,141	67	14	27	*5
Deaths	16	1	—	1	1	5	1	—	—	—
Deaths (0–1 year)	315	42	47	16	8	336	38	77	15	12
Infant mortality rate (per 1,000 live births)										
Deaths (excluding stillbirths)	4,854	738	551	158	110	4,577	706	650	150	111
Annual death rate (per 1,000 persons living)			11·1	9·9				13·5	9·5	
Live births	6,263	992	766	239	200	5,351	751	880	156	184
Annual rate per 1,000 persons living			15·5	15 0				17·7	9·8	
Stillbirths	175	28	18			145	18	26		
Rate per 1,000 total births (including stillborn)			23					29		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Deaths from measles and scarlet fever for England and Wales, London (administrative county), will no longer be published.

‡ Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

§ The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, London (administrative county), are combined.

‖ Includes puerperal fever for England and Wales and Eire.

EPIDEMIOLOGICAL NOTES

Influenza

England and Wales have been singularly free from epidemic influenza in recent years, and, apart from a few outbreaks due to virus A in residential communities at the beginning of 1947, there has been nothing to report since the mild epidemic due to virus B early in 1946. The first quarter of 1948 had the lowest figure ever recorded for deaths from influenza in the great towns. (See Table below.)

So far there has been no indication of epidemic influenza in England and Wales this year, but reports have been received of an epidemic probably due to a variant of virus B in Italy (Jan. 1, p. 39) and recently of a mild type of influenza in France and Belgium. It is not yet known what virus type, if any, is involved in France or Belgium. Since the importation of the disease into this country may be imminent it may be desirable to recapitulate briefly the main clinical features and certain measures which may be useful.

Clinical Features.—Diagnosis of an individual case of true virus influenza is usually difficult and often impossible; the occurrence of a number of similar cases at the same time is one of the most important leads to diagnosis. The onset is generally more sudden than that of a simple febrile catarrh, and the catarrhal symptoms are usually less marked at onset. Malaise and high fever with aching back and limbs are early symptoms. Headache, photophobia, and shivering are common. The clinical features vary a little in different outbreaks.

Treatment.—Penicillin and the sulphonamides are ineffective in the treatment of the primary virus infection but may be of value in the treatment of complications. Prophylactic doses of sulphonamides may be of value in an institutional outbreak where secondary infections with a sulphonamide-sensitive organism are known to be occurring.

Vaccines.—In recent epidemics in different parts of the world variants of the two main types A and B have been reported, and protective vaccines prepared against the main types have been ineffective against these variants. It is not yet known whether any existing vaccines are likely to have any value in protecting against the prevailing type, and in any case protective vaccination is impracticable as a general measure. It should be reserved for those who run special risks.

Infectious Diseases in 1948

Summation of the weekly figures for 1948 shows that the most notable feature during the year was the low incidence of influenza. The usual trend of influenza is one of a steady increase to a maximum during the first weeks of the year, but in 1948, for the first time in recent experience, no increase in mortality occurred. Whooping-cough was very prevalent, and the notifications were about 50% above the totals of recent years. The incidence of scarlet fever was also high. Notifications of acute pneumonia were slightly below the level of the preceding years. Notifications of diphtheria, which have been decreasing steadily since 1941, showed a further large fall. The incidence of cerebrospinal fever was about two-thirds that of 1947, but remains at about twice the pre-war level. Following the outbreak of 1947 the incidence of acute poliomyelitis declined considerably, but continues at about three times the pre-epidemic level in 1948. Notifications of the principal infectious diseases in England and Wales for 1948 and the four preceding years were as follows:

	No. of Notifications				
	1944	1945	1946	1947	1948
Scarlet fever	93,801	74,392	57,614	60,524	75,460
Whooping-cough	93,107	62,022	92,028	94,241	145,878
Diphtheria	29,446	25,059	18,156	10,258	7,903
Measles	117,437	443,002	154,826	399,461	396,841
Acute pneumonia	38,175	34,059	36,106	34,348	31,096
Cerebrospinal fever	2,883	2,691	2,627	3,147	1,971
Dysentery	10,150	16,533	8,441	4,179	5,534
Enteric (paratyphoid and typhoid) fevers	536	679	1,367	880	873
Acute poliomyelitis	510	799	703	8,592	2,017
Influenza. Deaths in the great towns	1,744	1,307	2,629	1,774	610

Poliomyelitis in Mauritius

Information now received from the island of Mauritius states that up to Dec. 31 a total of 192 cases have been notified with 5 deaths. Cases have occurred in ten different localities in the island, and there appears to be some spread from Port Louis, which reported the greatest number of cases in the early stages of the epidemic. Of all the cases notified 80% have been in children aged 1–5.

Inoculation and Vaccination of Travellers

Many countries insist that travellers, before entering their territories, should produce satisfactory evidence of having been recently immunized against certain diseases—particularly smallpox and yellow fever. Inoculation against yellow fever is required of travellers who have come from or passed through an "endemic yellow fever area" when they arrive by air in a country where, although the disease does not exist, there may be conditions which permit of its development. In order to avoid detention or delays at the frontiers of countries requiring these measures travellers must provide themselves with certificates of vaccination or inoculation on the appropriate prescribed international forms.

The Ministry of Health is often asked for advice on the optimum safe time limits which should be allowed to elapse between smallpox vaccination and yellow fever inoculation. A meeting of experts was therefore convened recently to review the subject. The following is a brief summary of the conclusions reached and should be considered as the official advice to those concerned.

1. That yellow fever inoculation should precede primary vaccination against smallpox.
2. That there should be an interval of at least four days between yellow fever inoculation (when given first) and primary vaccination against smallpox (when given subsequently).
3. That if primary vaccination against smallpox is done first there should be an interval of 21 days from the date of the vaccination before the yellow fever inoculation is given.
4. That where there is evidence of previous successful vaccination against smallpox, yellow fever immunization and revaccination against smallpox may be carried out at the same session, but if time permits yellow fever immunization should always precede revaccination by at least four days.

Minimum Age for Inoculation

For each of the commoner immunizing procedures recommendations were also made in regard to the minimum age under which it is not desirable to vaccinate or inoculate.

Immunizing Procedure	*Minimum age below which it should not be carried out*
Smallpox vaccination	No lower limit. Primary preferably before 6 months (optimum 3–4 months)
Yellow fever inoculation	No lower limit. May, if necessary, be given in first week of life at full dose.
Typhoid-paratyphoid inoculation	Not under 1 year of age
Cholera inoculation	Not under 1 year of age
Typhus inoculation	Not under 1 year of age

Discussion of Table

In *England and Wales* the notifications of infectious diseases fell sharply. There were marked decreases in the incidence of measles 841, whooping-cough 680, acute pneumonia 290, scarlet fever 272, diphtheria 24, and dysentery 24.

In contrast to the general decline in the incidence of measles large increases were recorded in Southampton 225 (due to the continuing outbreaks in Portsmouth C.B. and Southampton C.B.), Middlesex 59, and Nottinghamshire 47. A decrease in the number of notifications of whooping-cough was general throughout the country; the largest falls were in Lancashire 154 and Kent 75.

There was a decrease in the incidence of diphtheria in most areas, the only exception of note being an increase of 6 in Yorkshire West Riding. The largest fall in the notifications of scarlet fever was 44 in Lancashire.

Cases of poliomyelitis were notified in Surrey 3, London 2, Oxford 2, and Southampton 2 (Andover M.B. 2).

In *Scotland* there was a fall in the notifications of acute primary pneumonia 114, whooping-cough 48, scarlet fever 42, and dysentery 18.

In *Eire* a decrease was reported in the notifications of scarlet fever 53, measles 31, and diarrhoea and enteritis 12.

In *Northern Ireland* there were increases in the incidence of measles 13 and diphtheria 5 in Belfast C.B.

Week Ending January 1

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,125, whooping-cough 2,015, diphtheria 142, measles 11,121, acute pneumonia 1,050, cerebrospinal fever 28, acute poliomyelitis 20, dysentery 53, paratyphoid 3, and typhoid 7.

Medical News

Adviser on Palestine Refugees

Dr. J. D. Cottrell, medical officer of the World Health Organization, has been appointed adviser to the United Nations relief scheme for Palestine refugees.

Safety Codes

The Birmingham and District Industrial Safety Group have prepared a booklet, *Safety in the Works*, which includes three codes of safety practice for entry into tanks, vats, pits, pipes, flues, sewers, manholes, and similar confined spaces; construction and maintenance of floors, passages, stairs, and ladders in industrial premises; and for crane drivers. The booklet also reprints a note on personal protective appliances and devices by Mr. E. A. Kite, and there is also a short section by Mr. W. A. Bond on the safe guarding of milling machines. The booklet is well produced, and copies may be obtained price 1s., from the secretary of the Birmingham and District Industrial Safety Group.

World Federation for Mental Health

The articles of association of the World Federation for Mental Health, which was set up in London in August, 1948, have now been printed. The aims of the Federation include the promotion of mental health among all peoples, and of research to that end. Members of the Federation are national mental health organizations. The president is Dr. J. R. Rees, and the honorary secretary Dr. Kenneth Soddy.

Fund for Dr. J. R. Rees

Dr. J. R. Rees, President of the World Federation for Mental Health, has been voted £1,250 by the New York International Committee for Mental Hygiene for "courageous and inspiring leadership in promoting mental health and good relations among individuals, groups, and nations."

Wills

Professor John Kay Jamieson, of Trinity College, Dublin, and the University of Leeds, left £12,790. Dr. Thomas Henry Harker, chairman of the Board of Management of Southport General Infirmary, left £18,139. Dr. John Cameron, of Fortrose, left £11,298; Dr. Philip Meredith Roberts, Barton-on-Sea, Hants, £33,874; and Dr. Arthur Harold Shepard, of Dogmersfield, Basingstoke, £30,344.

COMING EVENTS

Chadwick Lectures

The following public lectures have been arranged by the Chadwick Trust (204, Abbey House, Westminster, London, S.W.1): Tuesday, Jan. 18, 2.30 p.m., at 26, Portland Place, London, W., Dr. R. F. Bridgman (Paris), "Health Services in France"; Tuesday, March 22, 4.30 p.m., at Westminster Medical School, 17, Horseferry Road, London, S.W., Dr. Helen M. M. Mackay, "A Health Service for Children"; Tuesday, June 21, 2.30 p.m., at 26, Portland Place, London, W., Dr. Sibyl Horner, "Evolution of Industrial Work for Women and Young Persons and its Effect on the National Health." Admission to the lectures is free.

Medical Films

The Scientific Film Association (34, Soho Square, London, W.1) has arranged the first of a series of monthly screenings of recent films to be given at the Medical Society of London, 11, Chandos Street, London, W., on Thursday, Jan. 20, at 6 p.m. The films to be shown on this occasion will deal with the subject of paediatrics and will include "Your Children's Sleep," "Progress Afoot," "A Case of Sturge-Weber Syndrome," "Infant Care," and "Know Your Baby." The screenings are organized primarily for the benefit of teachers of medicine.

Education for Family Life

The British Social Hygiene Council will hold a discussion on "Education for Family Life" at the Planning Centre, 28, King Street, Covent Garden, London, W.C.2, on Jan. 26, 1949, at 6.15 p.m. Mrs. Eva Hubback, Principal of Morley College, and chairman of the Education Committee of the L.C.C., will be in the chair, and Dr. Letitia Fairfield, Dr. Ethel Dukes, and Mr. Geoffrey Martin will take part. Ample time will be allowed for discussion. Information and tickets (price 1s.) can be obtained at the door or from the Planning Centre.

Nursing Conference

The Royal College of Nursing will hold a conference, "Health and Sickness," from Jan. 31 to Feb. 2, 1949. Discussion will centre round ways of achieving a closer unity between preventive and curative nursing in the light of Dr. John Cohen's minority report on the recruitment and training of nurses.

Association of Whole-time Salaried Specialists

A meeting open to all whole-time salaried specialists, whether members of the Association of Whole-time Salaried Specialists or not, to discuss matters of common interest, particularly in connexion with the National Health Service, will be held at the Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C., on Friday, Jan. 28, at 4 p.m., with Dr. Horace Joules, President of the Association, in the chair. Tea will be served from 3.45 p.m.

Oxford Graduates Medical Club

The Oxford Graduates Medical Club dinner will be held at the Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C., on Friday, Feb. 18, 1949, at 7 p.m. for 7.30 p.m. The cost is 26s., inclusive of drinks with the meal. Dinner jackets will be worn. All Oxford graduates who are medically qualified are members of the club. All who wish to attend should communicate with the honorary secretary, Mr. E. G. Tuckwell, F.R.C.S., 73, Harley Street, London, W.1.

The Association of Surgeons

The annual meeting of the Association of Surgeons of Great Britain and Ireland will be held in Dublin on May 26–28. The provisional arrangements are as follows: *Thursday, May* 26.—Business meeting. Discussion on "Surgical Ritual," opened by Sir Hugh Cairns, Sir Reginald Watson-Jones, Mr. Julian Taylor, Mr. F. Gill, Mr. D. M. Douglas. *Friday, May* 27.—Discussion on "The Use and Abuse of Streptomycin" (speakers to be announced later). *Saturday, May* 28.—Discussion on "The End Results and Treatment of Injuries to Peripheral Nerves," opened by Mr. H. J. Seddon (other speakers to be announced later). Fellows and Associate Fellows are invited to submit the titles and précis of short papers they wish to read at the annual meeting to the honorary secretary by the end of January. Those requiring accommodation in Dublin should apply as soon as possible to Hewett's Travel Agency, Hewett's Corner, D'Olier Street, Dublin. The agency is also prepared to make travel arrangements.

SOCIETIES AND LECTURES

Saturday

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION.—At Royal Free Hospital, Gray's Inn Road, London, W.C., Jan. 15, 3 p.m. Clinical meeting.

Monday

HUNTERIAN SOCIETY.—At the Mansion House, London, E.C., Jan. 17, 8.30 p.m. "*The Founding and Influence of a School of Surgery.*" Hunterian Lecture by Dr. John M. Finney, junr. (Baltimore).

Tuesday

CHADWICK TRUST.—At 26, Portland Place, London, W., Jan. 18, 2.30 p.m. "*Health Services in France,*" Chadwick Public Lecture by Dr. R. F. Bridgman (Paris).

INSTITUTE OF DERMATOLOGY, 5, Lisle Street, Leicester Square, London, W.C.—Jan. 18, 5 p.m. "*Principles and Practice of Treatment,*" by Dr. R. M. B. MacKenna.

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., Jan. 18, 11 a.m. "*Systemic Gonorrhoea,*" by Dr. A. H. Harkness.

ROYAL PHOTOGRAPHIC SOCIETY, 16, Prince's Gate, London, S.W.—Jan. 18, 7 p.m. "*Some Observations on American Medical Photography,*" by Dr. Peter Hansell.

SOCIETY OF CHEMICAL INDUSTRY: FINE CHEMICALS GROUP.—At King's College (Large Anatomy Lecture Theatre), Strand, London, W.C., Jan. 18, 7 p.m. "*The Approach to the Chemotherapy of Tuberculosis,*" discussion to be opened by Dr. James Walker, D.Sc., and Dr. P. M. D'Arcy Hart, F.R.C.P.

UNIVERSITY COLLEGE LONDON.—At Physiology Theatre, Gower Street, London, W.C., Jan. 18, 5.15 p.m. "*Blood and Circulation,*" by Dr. E. A. Underwood.

Wednesday

HARVEIAN SOCIETY OF LONDON.—At 26, Portland Place, London, W., Jan. 19, 8.15 p.m. Annual general meeting. "*A History of Surgery.*" Presidential Address by Mr. E. G. Muir.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330–2, Gray's Inn Road, London, W.C.—Jan. 19, 3.30 p.m. "*The Larynx. Organic Nervous Affections of the Larynx, Laryngeal Paralysis. Treatment—Educational and Operative,*" by Mr. V. E. Negus.

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., Jan. 19, 11 a.m. "*Treatment of Gonorrhoea and Complications,*" by Dr. A. H. Harkness.

Thursday

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, London, W.—Jan. 20, 8.15 p.m. Discussion: "*The Problems of Dosage in Heterogeneous Media.*"

DURHAM UNIVERSITY: DEPARTMENT OF SURGERY.—At Royal Victoria Infirmary, Newcastle-upon-Tyne, Jan. 20, 5 p.m. "*Physiology and Surgery.*" Fourth Rutherford Morison Lecture by Sir Henry Dale, F.R.S.

EDINBURGH CLINICAL CLUB.—At B.M.A. Scottish House, 7, Drumsheugh Gardens, Edinburgh, Jan. 20, 8 p.m. *"Stricture of the Oesophagus,"* by Mr. A. Logan.

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., Jan. 20, 11 a.m. *"Infestations due to Trichomonas Vaginalis,"* by Dr. W. N. Mascall.

MIDDLESEX COUNTY MEDICAL SOCIETY.—At Park Lane Health Centre, Tottenham, N., Jan. 20, 3 p.m. Meeting.

ROYAL PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN: SCIENTIFIC AND TECHNICAL GROUP, 16, Prince's Gate, London, S.W.—Jan. 20, 7 p.m. *"The Kinephotomicrography of the Living Cell,"* by Dr. A. Hughes.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—At 26, Portland Place, London, W., Jan. 20, 7.30 p.m. *"A Critical Review of Malignant Malnutrition (Kwashiorkor),"* by Dr. H. C. Trowell. A discussion will follow.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner, London, S.W.—At Large Lecture Theatre, Jan. 20, 4.30 p.m. Lecture-demonstration: Psychiatry.

Friday

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, London, W.—Jan. 21, 8.15 p.m. *"Intracranial Aneurysms—a Correlation of Their Pathology with the Radiological Appearances,"* by Dr. R. G. Reid and Mr. R. Johnson.

FACULTY OF RADIOLOGISTS.—At Royal College of Surgeons, Lincoln's Inn Fields, London, W.C., Jan. 21, 2.15 p.m. Diagnosis Section meeting. *"Radiological Investigation of Pancreatic Disease,"* by Dr. R. A. Kemp Harper. *"The Vascularization of the Human Stomach and the Shunting Effect of Trauma,"* by Dr. A. E. Barclay and Professor F. H. Bentley.

LONDON CHEST HOSPITAL, Victoria Park, E.—Jan. 21, 5 p.m. *"Pain in the Chest,"* by Dr. N. S. Plummer.

ROYAL INSTITUTE OF PHILOSOPHY.—At University Hall, 14, Gordon Square, London, W.C., Jan. 21, 5.15 p.m. *"The Ethics of Liberalism and the Ethics of Socialism,"* by W. B. Gallie, M.A.

ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh.—Jan. 21, 8 p.m. *"Medical Research as an Aim in Life."* by Sir Henry Dale.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—At South Kensington Hotel, 41, Queen's Gate Terrace, London, S.W., Jan. 21, 7.15 p.m. for 7.30 p.m. Dinner meeting. 8.30 p.m. *"American Medicine,"* by Professor John McMichael.

Saturday

BIOCHEMICAL SOCIETY.—At British Postgraduate Medical School, Ducane Road, Hammersmith, London, W., Jan. 22, 11 a.m. 272nd Meeting.

BRITISH ASSOCIATION OF ALLERGISTS.—At University College Hospital Medical School, University Street, London, W.C., Jan. 22. 11.30 a.m. and 2.15 p.m. Annual general meeting. *"Some Biochemical Investigations on the Allergens of Household Dust,"* by Professor C. Rimington. *"Some Immunological Aspects of Desensitization with Allergens of Household Dust,"* by Dr. Kate Maunsell.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Benison.—On Dec. 30, 1948, to Eileen (née Arthur), wife of Ronald Benison, F.R.C.S., a daughter.

Powell.—On Jan. 3, 1949, at Milland Vicarage, Liphook, Hants, to Leonore (née Trench) and Denis Powell, M.A., M.B., Ch.B., a second daughter.

Prentice.—On Dec. 17, 1948, at Colchester, the wife of Ian Prentice, M.C., M.B., twins, a son and daughter.

MARRIAGES

Crowell—Gunderson.—On Dec. 24, 1948, in London, Patrick L. Crowell to Eileen M. Gunderson.

McGhee—Copeland.—On Dec. 4, 1948, at Caxton Hall, Westminster, London, S.W., David McGhee, M.B., Ch.B., F.R.C., to Victoria Eugénie Copeland, of Bollington, Cheshire.

Purdie—Roberts.—On Dec. 18, 1948, in London, Anthony W. Purdie, M.B., Ch.B., F.R.F.P.S., M.R.C.O.G., to Erica M. G. H. Roberts, B.Sc., M.B., B.Ch., D.Obst.R.C.O.G.

DEATHS

Addison.—On Jan. 5, 1949, at St. Mary's, Isles of Scilly, William Bragg Addison, M.B., B.Ch., aged 85.

Alexander.—On Jan. 4, 1949, at Killearn Hospital, John Cassels Alexander, M.B., Ch.B., formerly missionary at Itu, Calabar, Nigeria.

Bullen.—On Dec. 31, 1948, at Yelverton, John Welply Bullen, M.D., Colonel A.M.S., retired, aged 88.

Falkner.—On Jan. 7, 1949, at a Bournemouth nursing home, after a short illness, Berkeley Foote Falkner, L.R.C.P.&S.I. and L.M., much loved husband of Annie Elizabeth, late of Woodleigh, Vivian Park, Swanage, aged 81.

Gibson.—On Jan. 5, 1949, as the result of an air crash, Anne Gibson, M.D.Ed.

Passmore.—On Dec. 31, 1948, William Henry Passmore, M.R.C.S., L.R.C.P., of Mornacott, Carshalton, Surrey, aged 76.

Phillips.—On Dec. 25, 1948, at Bwlch Glas, Nevin, North Wales, George Phillips, M.D.Ed., aged 79.

Pullin.—On Dec. 25, 1948, at Rahere, Honiton, Devon, Bingley Gibbes Pullin, M.R.C.S.

Raw.—On Dec. 26, 1948, at Alnmouth, Northumberland, Stanley Raw, M.D., F.R.C.S.Ed., aged 70.

Susman.—On Dec. 23, 1948, William Susman, M.D., of the Department of Pathology, Manchester University, aged 53.

Wilson.—On Dec. 28, 1948, at Riverside, 9, Trowlock Avenue, Teddington, Middlesex, Graham Lionel John Wilson, M.R.C.S., L.R.C.P., aged 84.

Young.—On Dec. 28, 1948, at Bedford, William John Young, M.R.C.S., L.R.C.P., of Bath House, Harston, Cambridge, aged 79.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

"Rapid" Rat Test for Pregnancy

Q.—*A request for the Aschheim-Zondek reaction of a patient complaining of 7½ weeks' amenorrhoea, and whose physical signs were compatible with early pregnancy, has been answered by this report: "Rat test weakly positive." What is the breed of rat used, how is the test carried out, and what is the percentage reliability?*

A.—Many biological tests for pregnancy in which the rat is used as a test object are available, but that most likely to have given rise to this question is one introduced in recent years, often called the "rapid" rat test. Here again several techniques are described. Tame female albino rats 21 to 30 days old are injected either subcutaneously or intraperitoneally with 1 ml. of a first morning specimen of the urine under test. The animal is killed two hours later and the ovaries are immediately exposed and examined. If they are pale or pale pink the reaction is negative, but if one or both are light to dark red it is positive. In other words, the criterion is the degree of vascularity of the ovaries, and it will be appreciated that the accuracy of the test depends a good deal on the experience of the observer. It is stated that it is more reliable if two or three rats are used for each test, but with only one rat many workers still claim 95% accuracy. Further details of this type of test are given by U. J. Salmon and others (*J. clin. Endocrinol.*, 1942, **2**, 167), H. S. Kupperman and R. B. Greenblatt (*Sth. med. J., Nashville*, 1946, **39**, 158), and P. H. Fried (*Amer. J. Obstet. Gynec.*, 1947, **54**, 689).

Testosterone for Prostatic Enlargement

Q.—(*a*) *Is there reasonable evidence that benign enlargement of the prostate is reduced by administration of testosterone propionate?* (*b*) *Has prolonged administration of this drug any harmful effect?* (*c*) *If so, what is the safe maximum dose and over what period should it be given?*

A.—Testosterone was originally suggested as a method of treatment for benign enlargement of the prostate, on the ground that such enlargement occurs in later life when the testicular secretion of testosterone is beginning to fail. There have been many clinical reports of symptomatic improvement. However, a subcommittee of the Medical Research Council was unable to produce convincing evidence—at least in so far as objective data were concerned—that testosterone had such a beneficial effect. There is no evidence of any harmful effects of this substance given in therapeutic dosage over a long period in adults.

Pressure-cooker as Sterilizer

Q.—*Can a pressure-cooker be used for sterilizing small dressings? The working pressure is given as 15 lb. What would the method be?*

A.—The answer to both parts of this question depends on the design of the cooker. A pressure of 15 lb. (6.8 kg.) of steam will not ensure absolute sterility—although, of course, it will in any case destroy all pyogenic cocci and other non-sporogenous bacteria—if the steam is mixed with the whole of the air contained in the cooker when it is closed. For efficient operation there should therefore be a tap through which the contained air can be expelled by steam before the pressure is allowed to rise; alternatively, the cooker could be closed when the water is already boiling in it, but this might be difficult and liable to produce scalded fingers. Dressings so treated would be damp. Presumably it is not suggested that this proceeding should be resorted to except in an emergency. Apart from being possibly unsatisfactory for the reasons given, it is a waste of time when sterile dressings can so easily be obtained commercially.

Russell Viper Venom

Q.—*What is the explanation of the fact that, while the venom of the Russell viper is used as a source of thromboplastin in the estimation of prothrombin and as a haemostatic in haemophiliacs, when it is injected by the snake itself it causes intense haemorrhage with constant oozing of blood from the punctures?*

A.—It is true that Russell viper venom is an extremely powerful blood coagulant, but this action is most pronounced when the venom is diluted 1 in 1,000 or even 1 in 10,000. At higher concentrations there is an anticoagulant effect which outweighs the clotting activity, and, moreover, the undiluted venom may quite rapidly dissolve any clots which form. The haemorrhage from the site of injection of venom by the snake is therefore probably due to this local proteolytic and anticoagulant effect where the venom is highly concentrated, and to the necrosis which results from capillary thrombosis and damage to tissue cells produced by the venom as it spreads through the tissues.

Vegetable Fats and Gall-stone Formation

Q.—*Is it safe to give fats of purely vegetable origin to persons with a gall-stone diathesis? Is phytosterol liable to form gall-stones if taken in any quantity?*

A.—It is generally believed that vegetable sterols are not absorbed by mammals, although this is disputed. However, the amount of cholesterol excreted in the bile is not related either to the concentration in the blood or to the amounts in the diet. There is therefore no reason to suppose that the amounts of vegetable sterols in the diet have any influence on the formation of gall-stones.

Respiration at Birth

Q.—*Can you explain the mechanism by which a newborn infant's respiratory centre is stimulated to initiate breathing during normal labour?*

A.—From the end of the first trimester of pregnancy the foetus *in utero* can, and in certain circumstances does, exhibit movements of the chest wall and diaphragm similar to those of respiration. Post-natal respiration can therefore, to some extent, be considered a continuation of an intrauterine function which has appeared along with the development of the nervous and muscular systems. Several factors seem to play a part in the onset of breathing after birth, but probably the most significant are the oxygen and carbon-dioxide levels in the blood. It is still unknown whether an increase in the latter or a decrease in the former is the more important, or whether both act together in a cumulative way. There is, however, an optimum concentration of these gases, and too little or too much of either hinders the onset of respiration. The physiological degree of asphyxia present at birth is a continuation of an intrauterine state, increased by the effect of uterine contractions on the placenta during labour, and ultimately brought to a head by the spontaneous cessation of the circulation in the placenta and cord or by ligation of the cord. Incidentally the natural birth process may also favour post-natal respiration in that compression of the chest wall, which is inevitable in the second stage, tends to squeeze out any liquor amnii from the trachea and bronchi.

In addition to the chemical stimulus to the central nervous system other factors undoubtedly play an important part in the onset of respiration, and among these are the numerous external stimuli to which the child is suddenly exposed. These include not only the sensation of cold and touch applied to the skin, but probably muscle and joint sensations. The face, particularly the area around the mouth and nose, is thought to be especially susceptible to external stimuli. It has also been suggested that a rise in blood pressure associated with cutting off the placental circulation may reflexly initiate respiration by stimulating the aortic and carotid sinus mechanisms. This, however, has been shown not to be an essential factor. It is possible that the different types of respiration seen at birth—for example, "the gasp" as opposed to a quiet rhythm—are the result of different mechanisms, the gasp implying some derangement of the higher nerve centres, often due to asphyxia. The whole problem is complicated, and for further details reference should be made to *Researches in Pre-natal Life*, by Sir Joseph Barcroft (Blackwell Scientific Publications, 1946). Attention was drawn recently to the importance of Sir Joseph Barcroft's work in this connexion by Dr. W. N. Leak (*Journal*, Oct. 30, 1948, p. 797).

Neglected Cleft Palate

Q.—*A woman aged 30 has a large congenital cleft of the palate involving only the soft palate and uvula and affecting her speech. She is very nervous, and it is thought that her defect contributes largely to this state. (a) Would an operative repair followed by speech training improve speech at this stage? (b) Is it possible to construct a prosthesis to fill a defect so far back in the mouth, and would this, again followed by training, improve speech?*

A.—In a neglected cleft of this kind the value of operation depends on several circumstances, local and general; these include the width of the cleft at its posterior end (at the uvula), and the distance of this point from the posterior pharyngeal wall; in general, operation is more justified for the intelligent patient, who will co-operate fully in later speech therapy. If the patient fears an operation, this will weigh against advising it. A prosthesis can always be constructed, but its efficiency depends on local conditions. It will never give normal speech, but with careful training it will usually confer some improvement.

Retinitis Pigmentosa

Q.—*What vitamins should be pushed in the treatment of retinitis pigmentosa? Please recommend a suitable dosage for a primigravida of 26 with this condition.*

A.—None. There is no rational basis for the use of any of the vitamins in retinitis pigmentosa. Some years ago the intramuscular injection of vitamin A was much publicized, but without justification.

Galvanism in Hemiplegia

Q.—*What is the value of the treatment of hemiplegia by a galvanic current passing between an anode on the parietal region and a cathode over the side of the neck? It is claimed that this stimulates the cervical sympathetic ganglia and improves the cerebral circulation, resulting in restoration of function. I shall be grateful for your opinion and references to literature.*

A.—There is no scientific basis for such a form of treatment. Krusen (*Physical Medicine*, Saunders, Philadelphia, 1944) states: "It was claimed that the current from the negative pole produces a 'stimulating' effect on the tissues beneath the electrode. Recent reports indicate that this is untrue." Similarly Kovacs (*Light and Electrotherapy*, Kimpton, London, 1945) points out that there is no good evidence that the cathode has any more stimulating effect than the anode. If the cervical ganglia were stimulated by this means it is open to question whether the effect would be beneficial. Vasoconstriction would result and the cerebral circulation might be further impaired

NOTES AND COMMENTS

Invalid Tricycle Association.—This is a non-profit-making organization which was founded in January, 1948, to help disabled people who use invalid carriages. It puts members in touch with each other, advises them on touring in this country and abroad, helps them with any problems of maintaining and insuring invalid tricycles, and runs a quarterly magazine called the *Magic Carpet*. Information may be obtained from the honorary secretary, Mr. Robert Lee, 18, Kings Drive, Edgware, Middlesex.

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology, Westcent, London*. ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

Authors desiring REPRINTS should communicate with the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors overseas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS should be addressed to the Advertisement Manager, B.M.A. House, Tavistock Square, London, W.C.1 (hours 9 a.m. to 5 p.m.). TELEPHONE: EUSTON 2111. TELEGRAMS: *Britmedads, Westcent, London*.

MEMBERS' SUBSCRIPTIONS should be sent to the SECRETARY of the Association. TELEPHONE: EUSTON 2111. TELEGRAMS: *Medisecra, Westcent, London*.

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.